

AMERICAN GAS ASSOCIATION MONTHLY

February 1928

Volume X

Number 2

An Industry Moves Forward to New Goals

By OSCAR H. FOGG

The New Competition for Domestic Sales

By E. FRANK GARDINER

Gas Will Be Supreme in 1977

By SAMUEL REA

**How to Convert Consumption and Revenue
Decreases Into Increases**

By FRED KARR

U. of Michigan Will Report on Coal Researches

By ARTHUR W. STACE

Manufacturers' Conference Plan

**New Testing Laboratory Will Be Last Word
In Buildings of Its Type**



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Annual
Convention
and
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of the A. G. A.

at

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Our Own Who's Who



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XXXIII

Walter Clarence Beckjord



BORN St. Paul, Minnesota, June 18, 1888. Educated in public schools of St. Paul, Minnesota, and graduated as electrical engineer in June, 1909, at the University of Minnesota. Entered in cadet engineering course St. Paul Gas Light Company in September, 1909, and after completing work in all departments finished the course in 1911, the first cadet to complete the course with that company. Became construction and electrical engineer for that company, doing construction and rate and valuation work until 1916, then entered employ of Madison Gas & Electric Company, at Madison, as general superintendent. Was appointed assistant engineer of American Light & Traction Company in 1916, doing construction, operation and valuation work for gas, electric and traction properties. Operated a coal mine in Kentucky, 1917-1918. Became engineer of the American Light & Traction Company in 1922. In 1926 was made vice-president and director. Served on Managing Committee, Technical Section, A. G. A., in 1924, and was elected chairman, Technical Section, 1925-1927, and reelected for year 1927-1928. Member A. G. A., A.S.M.E., N.E.L.A., and Society of Gas Lighting.

AMERICAN GAS ASSOCIATION MONTHLY

Vol. X

FEBRUARY, 1928

No. 2

An Industry Moves Forward to New Goals

A Vivid Picture of the Potential Power of Gas to Serve Mankind

By OSCAR H. FOGG

President, American Gas Association; vice-president, Consolidated Gas Co. of N. Y.

THE true progress of the gas business in Philadelphia really began about thirty years ago, when the present operators of the property, The United Gas Improvement Company, leased it from the City. Its history since then is well known, and while it is not necessary, it is at least permissible to say that, in this, one of her most important public utilities, Philadelphia today enjoys the benefits resulting from the wise and efficient management of one of the ablest and most progressive operating organizations in the United States.

Incidentally, these thirty years of progress in Philadelphia parallel fairly well the real growth of the gas industry throughout the Nation, for it was in the beginning of this period that the first important advances were made in the application of gas to purposes other than illumination. Cooking appliances were coming into more general use, heating appliances were growing rapidly in favor, and gas as a fuel for industry was beginning to command attention.

It was evident that the gas business was undergoing a radical change, in the course of which its methods were to be revolutionized and its economic status to undergo significant revision. Looking back to that time, we now realize that the

gas business was just beginning to discover its true mission.

In adapting itself to changed conditions, the gas industry not only has kept pace with, but often has anticipated the trend of American life toward higher standards of comfort, convenience, and efficiency. Today its service reaches out to nearly sixty millions (not including those served by natural gas). During the past twenty-five years, the sale of manufactured gas has increased 352 per cent, while the population of the country has increased only 50 per cent. In the past ten years the sale of gas per capita has increased 70 per cent, reflecting the wider use per customer as well as growth in the number of users.

Last year, 28 per cent of the gas output was sold for the varied and constantly growing purposes of industry, and 71 per cent was sold for domestic uses such as cooking, house heating, water heating and other household needs.

Beginning merely as merchants of light, our gas companies have advanced to the position of one of the country's greatest industries—purveyors of heat, ready to provide a heating service for the diverse requirements of domestic, commercial, and industrial life.

What is the future development of the gas industry to be?

It is doubtful if even we ourselves have yet a complete idea of the potential market for gas service. In a recent address, Samuel Insull referred to studies made by statisticians of his organization, which indicate that, in spite of what we have regarded as a rather satisfactory rate of growth, manufactured gas now supplies only about two per cent of the total heat requirements of the country.

Not even the most reckless prophet will venture to suggest that the remaining 98 per cent of America's heating demand is ours to satisfy in either the near or distant future—and there is no occasion to leave the borders of sound judgment so far behind—for in the practical potential market for gas service, there is a field so great as to make all that has been accomplished so far seem very small.

Of the several important fields for gas utilization, that awaiting us in the heat requirements of industry alone affords a potential market that puts imagination to the test. In spite of the strides that industrial gas has made (a recent estimate places it as a useful fuel in more than 21,000 industrial and factory operations) there lies before us relatively virgin soil. It includes many opportunities that may not be immediately accessible, but gauged by recent progress, the problems they wait upon are not insurmountable.

TECHNICAL ABILITY NEEDED

The recent trend in industrial economics has served to emphasize some of the inherent advantages that place gas in its preeminent position as an industrial fuel. Among these we include qualities of the most substantial sort, which can be definitely ascertained and expressed in dollar values, as well as those which we must regard as intangible, but which, although incapable of being expressed in monetary terms may, and frequently do, influence the choice.

In many instances, when the application of gas fuel to some industrial process is under consideration, one or another of these advantages is enough to lead to its

adoption. When, however, we still prove unsuccessful, and we are satisfied that the value of our service has been measured by a broader scale than that of fuel cost accountancy alone, then we must recognize the fact that we are squarely up against one of our major problems: How to supply gas service in the future at an even lower price and keep at least abreast—but preferably in advance—of the march of industry, toward lower production costs.

The answer to this and several other questions equally important to us will largely determine what the future of the gas business is to be.

Let me present the view of a distinguished past president of the American Gas Association, H. C. Abell, who said in a recent address that "The future of the gas industry depends very largely upon its being able to compete with all other sources of heat which the prospective customer can obtain on a comparable basis of cost, convenience, health, customer's own investment, stock of fuel required, etc. In order to meet the economic competition and obtain the most prosperous position in the future, it will be necessary that the highest technical ability and skill be constantly and diligently at work on research investigation of gas production, distribution and most effective and efficient utilization with due regard to service. In its ultimate analysis this means that the engineering and technical branches must at least keep pace with the competitive demands and requirements. If the gas industry is to develop to its greatest extent, the technical work should at all times be considerably in advance of the demands and must include not only the manufacture and distribution of gas, but also its utilization."

Of the many influences that will shape that progress, those of principal interest for brief consideration are:

First, more economically sound and flexible methods of charging for service than are generally employed at present.

Second, improved efficiencies and greater economies in our own production and distribution methods.

And third, constant development of and improvement in the utilization of gas for industrial purposes.

The buyers of heat in most instances may readily change from one source of supply to another as their needs or as economic conditions vary. The sellers of heat—or, rather, fuel—particularly those who furnish it in large quantities, are in a field of keen competition, which is continually sharpening as refinement of processes and methods responds to the demand of industry for higher efficiencies and lowered costs. Under this wholesome stimulus, the gas business has made rapid progress in working out scientific and economically sound methods of charging for its service.

It is an unenlightened person who will not admit that, until recent years, we had been backward in this regard. An unnecessarily conservative attitude for a long time hindered the development of industrial gas utilization by leaving in its path inadequate, obsolete, and in some cases even discriminatory rate forms.

Today these obstacles are being swept aside, and the gas business is making splendid amends for the delay in building its rate structure to conform with the economic conditions. Not only has the industry spurred itself to wise and decisive action, but those who regulate it—the public service commissions of the country—have kept progressively in step. Only a few months ago, the Committee on Public Utility Rates of the National Association of Railway and Utilities Commissioners presented its report to the national body, approving and supporting the principles of scientific gas rate-making, which our industry now accepts as sound, wise, and far-reaching in their influence upon the public interest as well as upon the future of our business.

So it is a fact that one of our most vexatious problems—rate structure—is in process of solution, and while we still

have far to go there has already accumulated a fair-sized scrap heap of discarded theories and worn-out ideas.

But over and beyond the question of economically sound rate structure, what is there now or in the future to justify the hope that we may realize substantially lower production costs, with corresponding reductions in rates to the users of gas service? I need not remind you that the two go hand in hand in our regulated industry, where our earnings are limited to a fair and reasonable return.

Before we approach the potentialities that are gripping the imagination and shaping the thought and researches of our scientific and technical men, let us consider the items that most influence present production costs.

PRESENT PRODUCTION COSTS

Approximately three-fourths of the present manufacturing cost of gas (that is, cost of producing the gas) is in the cost of raw materials—chiefly coal and oil—and we know of nothing that indicates how much, or when, these commodities will cost less than they do at present. That is also true of direct labor. As to indirect labor, which makes itself felt through the labor cost element in the price of materials—in the mining of coal, the production of oil and other essential materials and in their transportation from the point of production to the place of use, we continue at a high level, and there seems to be nothing in the opinions of economists and students of the present social state to suggest that any substantial reduction in this group of costs seems likely in the near future.

Labor-saving machinery is already used extensively in both the manufacture and distribution of gas. While our production men are constantly on the alert to obtain every possible saving, there is nothing tangible at the moment to which we can look for any substantial gain in these operations which so largely affect our basic cost.

But the fixed charges on our invest-

ment constitute no small item, and if it happens that the demand for our service becomes too variable because of seasonal requirements, in short, if it results in an unfavorable plant load factor, these items of fixed cost loom even greater in the aggregate. It is in this respect that the growth of the house heating load, if confined to the short heating season of the winter months, becomes of such critical moment in certain sections of the country. The use of gas in large volume for industrial and other year-round purposes has not yet been developed sufficiently to prevent the house heating demand from rising to unexpected peaks. Under such conditions, production and distribution facilities must be equal to the maximum strain that may be placed upon them. It is obvious that if this peak of demand occurs through only a brief period of the year, there will be extended periods when a large part of the investment is not in use and can produce nothing but fixed charges which the rate schedule cannot ignore.

THE REMEDIES

We believe there are several ways to improve this condition. First, by endeavoring systematically to develop our business so that the diversity of use will result in a more favorable plant load factor. Intelligent sales promotion will play its part in this, aided by inductive rates, for off-peak business, which need no demonstration of their value in helping to balance the inequalities of output. This condition also emphasizes the importance of developing new off-peak utilization.

The creation of this diversity of demand provides an attractive field for study. Other industries have had to meet it, and it confronts us now as the direct result of the magnitude to which our house heating load has grown.

But gas service has a wide range of practical utilization. It is capable of supplying almost any volume and range of heat intensity needed in industry. Its practicability for both small and large

scale refrigeration has already been demonstrated, and its application to air cooling for homes, places of public amusement or assembly, and in certain manufacturing operations, invites development. Large volume water heating in summer months, when the central heating plants of commercial, industrial and apartment buildings may be shut down, depends only on the price at which gas service can be offered. We are still far from the saturation point in domestic or household use, and the diversity of requirements that gas is so well able to satisfy in so many and such varied fields of utilization provides many channels leading to a better balanced load.

While the utilization specialists are at work in that direction, the production experts will be devising ways to employ these periodically idle plant facilities for useful purposes other than, and possibly quite remote from, those for which they were originally intended. The complete working up and marketing of chemicals derived from the by-products of carbonization, or even the operation of such facilities to supplement the production of other manufacturing enterprises or to produce other marketable commodities are among the possibilities that alert minds will not overlook.

Increasing attention is being given to the project of massing gas production facilities, away from the cities, directly in the coal-producing areas, and conveying gas to the centers of population over greater distances than have hitherto been felt to be practicable. Also receiving careful thought is the extent to which existing production facilities may be pooled or combined, and by interconnection of mains, greatly enlarged capacity, and greater diversity of demand, may be secured with relatively small increase in the capital investment. How far either or both of these will actually lead to a reduction in the price of gas service to the ultimate customer is for the engineer to determine after weighing the conditions of investment, operating cost and related

(Continued on page 98)

Ohio Association Affiliates with A. G. A.

Important Gas and Oil Men's Association Is Sixteenth to Join A. G. A. Roster

THE Ohio Gas and Oil Men's Association is now affiliated with the American Gas Association, according to announcement made by Oscar H. Fogg, president of the A. G. A.

The Ohio Association, which has a total membership of 1700, and is one of the most active state organizations in the country, is the sixteenth group to be added to the role of affiliated A. G. A. associations by action of the Executive Board.

John J. McMahon, of the East Ohio Gas Company, Cleveland, Ohio, is president of the Ohio association, and Wm. H. Thompson, 811 First National Bank Bldg., Columbus, Ohio, is secretary-treasurer. The official address of the Association is that of the secretary-treasurer.

Affiliation with the American Gas Association gives state utility associations complete representation on A. G. A. Section Committees. It also stimulates the exchange of valuable information and coordinates committee activities.

Established July 10, 1918, at Columbus, the Ohio association has been of widespread influence and of material aid to the oil and gas industries of the State. The annual conventions have been especially well attended, and the programs have been outstanding for their valuable papers and contributions to the indus-



TO welcome the Ohio Gas and Oil Men's Association as an affiliated association of the A. G. A. at this time is a pleasant task. This important association has six years of activity for the industries of Ohio as testimony to its value, and it is expected that affiliation with the national organization of the entire industry will help it to be of even greater service in the years to come.

Pictured above are (left) John J. McMahon, President of the Ohio association, and (right) Wm. H. Thompson, secretary-treasurer.

tries' advancement. More than 1000 were registered at a recent convention.

The Association has published a monthly journal, *The Ohio Gas and Oil Men's Journal*, continuously since August, 1919. This magazine is sent to all members of the Association. Miss R. G. Stone is editor.

The other associations affiliated with the American Gas Association are:

Canadian Gas Association.

Empire State Gas and Electric Association.

Illinois Gas Association.

Indiana Gas Association.

Michigan Gas Association.

Mid-West Gas Association.

Missouri Association of Public Utilities.

New England Gas Association.

New Jersey Gas Association.

Oklahoma Utilities Association.

Pacific Coast Gas Association.

Pennsylvania Gas Association.

Southern Gas Association.

Southwestern Public Service Association.

Wisconsin Utilities Association.

Chicago's First Blue

Star Home Is Opened

CHICAGO'S first Blue Star Home has been opened at 10036 South Seeley Avenue by the Beverly Realty and Investment Co. The home contains the following gas equipment: Clothes dryer, washer, laundry stove, ironer, incinerator, storage water heater, house heating boiler, radiant heaters, and range.

Physicians Favor Gas for House Heating

Baltimore Doctors Find That They Can Do it Better
with Gas in the Winter Months

By EUGENE D. MILENER

THAT heating one's home with gas appeals to discriminating persons is attested to by the long list of Baltimore physicians who have adopted this advanced method of keeping their homes warm throughout the winter. Probably no group of men are better able to judge the advantages of automatic house heating than members of the medical fraternity. There is a definite health value in living in a house that is uniformly heated. Colds are eliminated, and people can freely move about the house without wraps.

The time spent shoveling coal and totting ashes can be spent much more profitably and pleasantly in other ways. It is unhealthy to breathe the dust that flies from an ash shovel, unhealthy not only for the person wielding the shovel, but unhealthy also for other persons in the house who cannot escape the atmosphere of dirt.

Gas heat is smokeless; other methods of heating are not. The advantages to health of smoke elimination are widely recognized and Baltimore doctors are doing their share to eliminate this nu-

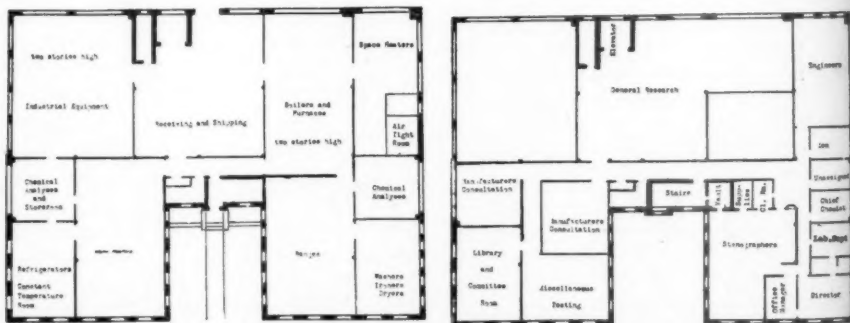
sance, in so far as their own homes are concerned.

The long list of physicians who automatically heat their homes with gas reads like a list of "Who's Who" in medicine. Ten prominent members of the staff of the Johns Hopkins Hospital, headed by the director, are enthusiastic users of gas heat. Altogether there are one hundred and thirty doctors who enjoy this convenience in their homes. That the choice of this large percentage of our public health guardians has been gas, is convincing evidence that it pays to rid the home of soot, ashes, and smoke.

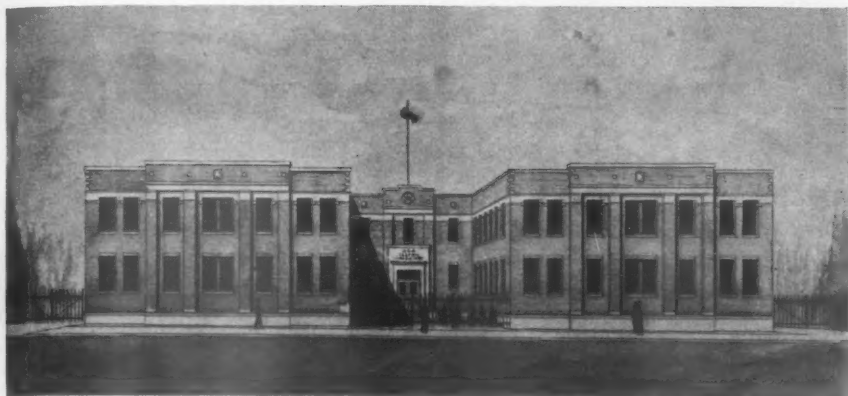
Roll of Honor

DEMONSTRATING their confidence in the future of the gas industry and in the leadership of the Executive Board of the Association, the following manufacturer member companies paid the maximum annual dues of \$5,000 for the year 1926-1927:

The American Meter Company, New York.
The Bartlett Hayward Company, Baltimore, Md.
The Koppers Company, Pittsburgh, Pa.



Floor plans of the new A. G. A. Testing Laboratory at Cleveland, Ohio. At the left is shown the first floor plan, and at the right is the second floor. The basement plan is on page 74



Architect's drawing of the new A. G. A. Testing Laboratory at Cleveland, Ohio

New Testing Laboratory Will Be Last Word In Buildings of Its Type

**Plans for New Building Are Announced; It Will Be Erected
In Cleveland Near Present Site**

THE appliance testing activities now being carried on in the present building in Cleveland occupied by the American Gas Association Testing Laboratory will soon be conducted in the new permanent home of the Laboratory, which will be situated on East 62nd St. about 200 ft. from the present site. The new building will be erected on land now belonging to The East Ohio Gas Company, which generously donated the present building and a great deal of equipment. Through the interest of R. W. Gallagher, President of the East Ohio Gas Company, and chairman of the Laboratory Managing Committee, this company has given splendid support to every Laboratory activity.

The Laboratory's new home will cost approximately \$150,000 to erect complete, and it will be so constructed and outfitted as to give the greatest possible utility to the testing activities of the gas industry. It will be absolutely fireproof, of brick walls with steel frame.

Planned to serve every purpose de-

manded of such a building, the Laboratory will be the last word in this type of structure and will incorporate the ideas of the best engineers and architects in the country.

Present plans call for a building with an office-type front finished with face brick, and a factory-type back, finished with common brick. All partitions, except possibly those in the offices, will be of steel and clear glass. They will be sectional to give maximum flexibility and to permit of economical rearrangement when the necessity arises.

Gas will be used to heat the building, and refrigeration service will also be given by this fuel. The building is so situated that it will benefit from a maximum of natural light, as is apparent from the architects' drawing shown, and the artificial lighting will be of the latest and most efficient type and design.

Total cost of erecting the new building is put at \$150,000. The land is to be bought, sidewalks and driveways laid, two



Basement plan of new Laboratory.

additional 5,000 cu.ft. holders built, etc. This cost also includes moving the present equipment, wiring, heating, plumbing, etc.

The outside dimensions of the new building are 101 ft. by 130 ft. The gross square feet of floor space is as follows:

Basement	3,600 sq.ft.
1st Floor	11,500 sq.ft.
2nd Floor	11,500 sq.ft.
Gross Area	26,600 sq.ft.

The floor space will be divided approximately as follows:

Office	3,200 sq.ft.
Testing	14,700 sq.ft.
Storage	8,700 sq.ft.

The necessity for a new Laboratory was brought out in the report of a special committee appointed for such purpose by the Executive Board. The Board approved the report, and decided that since the Testing Laboratory had already demonstrated its value to the gas industry, it was imperative to erect a new building so that the work would not suffer from lack of suitable space.

The splendid support given the Laboratory by gas companies and manufacturers has resulted in a tremendous growth of activity. At the present time several of the testing departments are badly crowded, and additional space is only available by constructing a new building, which is absolutely necessary for the

efficient functioning of the various testing programs.

In addition to conducting approval tests on four major types of gas appliances, the Laboratory is completing investigations necessary in the preparation of new requirements and the revision of old ones, and is also conducting exhaustive researches on the mixing of various kinds of gases. The result is that the present facilities have been taxed to the utmost, and all departments have been hampered.

The Laboratory now occupies approximately 12,000 sq.ft. of floor space. Estimates place 20,000 sq.ft. as the necessary amount in 1930, and the present building is being planned to care for this growth. Provision has been made in the new building to allow for almost unlimited expansion. It will be possible to build additions to the sides of the building, and in so doing keep all testing work as near as possible to the ground floor.

As of December 31, 1927, the Laboratory had approved, either from inspection or test, 7,198 models of gas appliances. This figure reveals the splendid work done during the past two years and a half, but it tells only part of the story. It is estimated that there are probably more than 40,000 additional models of gas appliances yet to be tested.

The committee which recommended that a new Laboratory be built consisted of the following:

James Lawrence, chairman; R. W. Gallagher, O. H. Fogg, W. C. Beckjord, R. R. Young, J. S. DeHart, Jr., H. E. McGowen, and H. M. Brundage.

Pamphlets Available

NATURAL Gas in 1926" and "Natural-Gas Gasoline in 1926" are the titles of two pamphlets recently issued by the Bureau of Mines and obtainable from the Superintendent of Documents, United States Government Printing Office, Washington, for \$0.05 apiece. Each contains a brief discussion of its subject in addition to extended statistics.

The New Competition for Domestic Sales

Changing Competitive Conditions Demand Cooperative Advertising to Protect Home Use of Gas

By E. FRANK GARDINER

Publicity Director, Midland Utilities Co., Chicago, Ill.; Chairman, Publicity and Advertising Section

HOME life in America is undergoing an economic change. The woman of today is finding more time for leisure and entertainment because housekeeping has been simplified and made easier. This is a natural development, yet it is of vital interest to the gas industry.

Monday is no longer "wash day" in hundreds of thousands of American homes. Saturday is no longer "baking day" when an abundance of bread, cake, and pies are baked for the Sunday feast and the days that follow.

This is due to two things:

Development of apartment house life in the larger cities and particularly small apartments with so-called kitchenettes.

Growth of the bakery, restaurant and laundry business of the country.

The modern housewife puts the soiled clothes in a bag and the laundryman calls for it on Monday morning. About the middle of the week it is returned, cleaned, and ironed and ready for use. The system is simplicity itself. The difficulty of finding a competent laundress and the weekly muss about the home is eliminated. The cost is oftentimes less than it would be if a laundress came to the home at so much per diem, "plus car fare," plus lunch, plus another day's work



Nation's Business magazine, in this cartoon, forcibly shows that cooperative endeavor is needed in the 1928 battle of industry against industry

in order to get all the ironing done.

Today the modern housewife also buys most of her bread and pastry, except possibly now and then an occasional home-baked pie or cake in an effort to maintain her reputation of being able to grace her table with a delicacy "like mother used to make."

Perhaps the gas industry is but a victim of circumstance in this changing world. Thanks to the enterprising packers

of foodstuffs in tin cans, the bakers who bake in wholesale quantities and the laundrymen who have removed the smell of soapsuds from the home; the housewife of today can pick up the evening meal on the way home from the matinee and, spreading clean linen from the laundryman's cardboard box be prepared to serve the inner man in less time than it formerly took to prepare the bread dough for the oven.

Of course the domestic load is not a total loss by any means. The more general use of gas for heating water and the use of space heaters is growing steadily. The establishment of home service departments by many gas companies has stimulated cooking in the home and checked somewhat the decline in the use of the kitchen range. It is a fact, never-

theless, that the development of the laundry, baking, and restaurant business of the country is reducing the use of gas in the kitchens of American homes and therefore presents a problem which should be the subject of study by everyone in the gas industry.

The laundry business of today is approximately four times what it was eighteen years ago. The value of the bakery products sold to the public for home consumption today is approximately three times what it was thirteen years ago. The number of restaurants in the United States has more than doubled in the last seventeen years.

More than 75,000,000 meals are now served daily in the restaurants, hotels and other eating places in the country. Nearly twenty per cent of all meals are eaten outside the home today. In such cities as New York, Chicago, and San Francisco from 25 to 30 per cent of all meals are eaten outside of the home.

These statements are not guesses. They are based on reports of the United States Census of Manufacturers of the Department of Commerce and from surveys made by the industries themselves.

These facts are of vital importance to the gas industry. They mean that the character of the gas consumer is changing and changing rapidly. They mean that the consumption of gas in the individual home—the backbone of the gas industry—is decreasing.

The following figures taken from the reports of the United Census of Manufacturers show the steady growth of the laundry business over a period of several years:

<i>Year</i>	<i>Volume of Business</i>
1909	\$104,680,086
1914	142,503,253
1919	236,382,369
1925	362,295,000

The census figures for 1909, 1914 and 1919 are for laundries doing an annual business of \$500 or more. The census report for 1925 includes only laundries doing a volume of \$5,000 or more a year.

The Laundry Owners National Asso-

ciation estimates the laundry business in 1927 aggregated \$500,000,000.

The value of the products sold annually by the bakeries as found in the census reports follows:

<i>Year</i>	<i>Value of Products</i>
1914	\$ 491,893,025
1919	1,151,896,318
1921	1,089,971,652
1923	1,122,906,314
1925	1,267,857,169

These figures do not include bread, rolls and pastry baked by hotels, restaurants, and boarding houses, but do include bakery products which are sold in connection with restaurants.

In 1910 there were 60,832 restaurants in the United States. In 1920 this had risen to 87,987. In 1926 the number had jumped to 128,720.

In New York state there were 7500 restaurants of all types in 1915. Ten years later the number had increased to 17,000. Most of this increase came after 1920, nearly 7000 permits being issued to new establishments after 1920 compared with 3000 from 1915 to 1920.

A study of these figures reveals the natural economic revolution which is going on in the American home today. They mean that the gas industry must develop new markets to take the place of its decreasing domestic business. Of course, progress has already been made in this respect by the development of the sale of gas for industrial purposes, for house heating, and for water heating in the home. But the economic change which has come about in the average American home, particularly in the last five years, calls for a concerted campaign for the sale of gas as a substitute for other fuels on a greater scale than ever before, if the gas industry is to march forward as it has in the past.

The various industries to which may be traced the reason for a reduction in the consumption of gas in the home are progressive. They are developing their business through well-planned programs of expansion.

While the American Gas Association was holding its annual convention at the Stevens Hotel in Chicago last October the Laundry Owners National Association was holding its convention at the Hotel Sherman a few blocks away. This latter association represents most of the 5500 power laundries in the United States, doing an annual business of half a billion dollars. The chief feature of the convention of the laundry owners was the launching of a national advertising campaign and drive for new business.

The laundrymen's national campaign which is now in full swing is one of the biggest and most spectacular in the history of cooperative advertising. At their convention in Chicago they pledged support to a \$20,000,000 advertising program, covering a four-year period, \$6,000,000 of which will be invested in a national campaign over the association's name. The remainder which goes largely into newspaper advertising is invested directly by the local laundrymen or local associations in local media. But the whole

Laundry-washing Saves Money

... because of the enormous rubbing loss in increasing volume of business, the modern laundry is able to offer a superior quality of work at prices considerably less than home-washing costs . . . Dainty Wash Service, exactly what home washing gives you, averages about half the cost of home doing, counting laundry bills, mangle, wringer, ironers, bluing, starch, gas, water, repairs and depreciation on equipment, interest on investments, etc. . . . It is the substantial difference in cost that is daily prompting new thousands of women to patronize the laundry—many of whom are thrifty home-makers who formerly imagined they could not possibly afford laundry services. If you will make a comparison between laundry and home-washing costs, you, too, will discover that it is now possible to get from the laundry a better quality of work for less . . .

The LAUNDRY/ does it best

Copyright © 1917
The Laundry Trade Association
New York City

This Advertisement is in the interest
of the LAUNDRY INDUSTRY -
as shown by the Undergoing:

This Advertisement may
be loaned over the first
names of either group
or individual subscribers

Home Washing

Doing Laundry

Home Washing

Doing Laundry

Home washing costs more than laundry service because of the enormous rubbing loss in increasing volume of business, the modern laundry is able to offer a superior quality of work at prices considerably less than home-washing costs. Dainty Wash Service, exactly what home washing gives you, averages about half the cost of home doing, counting laundry bills, mangle, wringer, ironers, bluing, starch, gas, water, repairs and depreciation on equipment, interest on investments, etc. It is the substantial difference in cost that is daily prompting new thousands of women to patronize the laundry—many of whom are thrifty home-makers who formerly imagined they could not possibly afford laundry services. If you will make a comparison between laundry and home-washing costs, you, too, will discover that it is now possible to get from the laundry a better quality of work for less.

The laundry man proposes to get business by national advertising

[illegible]

National advertising by the laundries will help cut the gas consumption in the home

program is coordinated from the national campaign headquarters.

The goal of this intensive advertising campaign and drive for new business is—one billion dollars in 1930. In other words, the laundry industry is out to double its business in less than four years.

The laundrymen believe that their business, even though it has grown rapidly in the last few years, can be greatly stimulated and increased by a cooperative advertising campaign. There is a lesson in this for the gas industry. We have no quarrel with the laundry owners. As was stated earlier in this article, the development of the laundry business is natural, although its growth is sure to be greatly stimulated by its aggressive advertising and sales campaign. It means, however, that the gas industry must go after new business on a greater scale than ever before.

Taking the baking of our daily bread from the home to the big white tile institutions where the fresh loaves come out of the ovens on conveyer belts by the thousand to be wrapped and sealed by automatic machinery didn't necessarily

The Laundry Dryer
For Which You Have Been Looking

WITHOUT modern laundry equipment, you lose both time and money, and work at least twice as hard as you need to.

The gas heated laundry dryer, automatically controlled, provides the nearest and cheapest method of drying clothes.

By installing this appliance, you will save



The Laundry Dryer
Gas-Heated Laundry Dryer
Convenient

one-half of the space now wasted in your drying room. Both in summer and in winter, it ends your troubles from rust, soot, dust and smoke, which soil the clothes.

Clothes always come from the Gas Dryer spotlessly clean, and are dried in half the time consumed by the old method.

Ask Your Gas Company

CONSOLIDATED GAS COMPANY OF NEW YORK
GEO. B. CORTY, President
130 East Fifth Street Telephone STUYvesant 4900

The New York Company offers competition to the laundry people

mean that the industry lost all of the baking load, because gas is used for fuel in many bakeries. It does mean a great loss, however, because all bakeries do not use gas and those that do naturally use it in wholesale quantities and with greater efficiency. On the other hand, the taking of the family washing from the home does mean a loss, because laundries are not equipped with gas-fired boilers. There awaits an important field for the industrial gas salesmen to conquer and one that is of great importance to the industry.

The gas industry has developed rapidly in the last few years. The last ten years have seen great changes. New markets have been opened up. Yet the gas industry does not stand as high in the public mind as it should.

Gas, lacking the mystery, romance and adaptability to the multitude of uses to which electricity can be put in the home, has failed to fire the imagination of the American public. Perhaps the industry in the past has been more concerned with the B.t.u., the pressure, and the specific gravity of its product than with its sale. Perhaps it has kept its eye too closely on the calorimeter rather than scanning the horizon for new fields to conquer.

Isn't it time for the gas industry to do some cooperative advertising? Association advertising is a demonstrated suc-

cess. Many industries are doing it. They have found it worth while.

The gas industry has many things to advertise. There are also many barriers in the public mind which it can overcome by advertising.

A national advertising campaign could do these things:

Acquaint the public generally with the progressiveness of the industry in establishing a laboratory for the testing of gas-burning appliances and setting basic standards of efficiency and safety which manufacturers must meet before their appliances are approved.

Acquaint the public with the fact that the gas companies have pledged themselves to sell only appliances which bear the stamp of approval of the Association's Laboratory.

Keep before the American investor the fact that the securities of gas companies represent a growing industry, backed by more than 100 years of steady progress.

Acquaint the public with the advantages of gas for heating homes and for making available a dependable supply of hot water at all times.

Keep before manufacturers the advantages of gas for industrial purposes.

This is a world of keen competition. Advertising is one of the necessary weapons in the fight for business. A special committee appointed to study the need for national advertising has reported in favor of it. Lack of funds has thus far prevented the committee's recommendation from being carried on. Let's devote 1928 to getting support to a program of national advertising, preparing a plan to finance it, mapping out the campaign and then swing into 1929 with an organized effort to sell the industry to the public and back the industry in the greatest sales program it has ever known.

THE British Industries Fair is to be held at Birmingham, England, from February 20 to March 2. Representative firms from all branches of the gas industry have taken space, and their exhibits will take some 16,000 sq. ft. of space.

Manufacturers' Conference Plan

Important A. G. A. Section Is Considering Ways and Means of Becoming More Valuable to Industry

BECAUSE industries sustained either directly or indirectly by public service companies present a far more complex nature than is usually the case, it becomes essential for a most complete coordination of effort to be built up between the utility companies on one hand and those companies engaged in the manufacture of equipment and appliances on the other. It is axiomatic that the first cannot prosper without the second, and *vice versa*.

That such cooperation has not existed in the gas industry to the fullest extent for some time is apparent upon studying the situation as set forth in the above preamble. Many reasons for the lack of this cooperation could be cited. However, the object here is not to place emphasis on the errors, but rather to find a means of eliminating them.

The American Gas Association has done a great deal of extremely constructive work in the past few years, and it is evident that the industry is greatly gratified at the successful meetings and the important accomplishments. However, a large portion of the work has been directed more or less to help the gas companies and has not pertained primarily to the welfare of the other important branch of the industry—the companies manufacturing appliances and equipment. With no idea of interfering in the slightest with the splendid work being done for the gas companies engaged in selling gas service, but rather with the aim of pulling together the various interests that constitute the industry as a whole, that all may benefit thereby, the Manufacturers' Section of the American Gas Association has determined to become a more active and valuable group than it has been.

At a recent meeting of the Manufacturers' Section, held in New York, there was proposed a plan, which, if carried through to a successful conclusion, will

undoubtedly tie the various manufacturers much closer to the A. G. A. and, hence, to the industry, than previously, and would also give the manufacturers a more complete conception of the gas companies' interests and requirements.

The plan calls for the organization of a conference composed of delegates from each group of manufacturers engaged in the same line of business. The chairman of the Manufacturers' Section of the A. G. A. will call the delegates together not less than four times a year, and as many more times as may be expedient. It is proposed that the conferences be held at any points in the country which may be selected. They will be under the auspices of the Manufacturers' Section of the American Gas Association, and the chairman of this Section will preside. Any paper work, reports, or other necessary data can be compiled either by the Manufacturers' Section or by outside agencies, as may seem best.

These delegates to the conference will represent their specific group, which in turn will be made up of manufacturer companies in each line, such as range manufacturers, meter manufacturers, etc. The chairman of the Manufacturers' Section will select a chairman of each of the groups which are not at present organized, and these men will organize their groups for the selection and instruction of delegates to the conferences.

It is suggested that when the manufacturers in a certain group have made a selection of their delegates, that one of these delegates be chosen as a chairman, and these delegates who represent their group should come prepared to discuss at the conference such matters pertaining to the industry as a whole in which their group may be particularly interested, and in addition to take part in any subject that may come before the conference.

Inasmuch as the Managing Committee of the Manufacturers' Section is the party under whose auspices these conferences will be held, the personnel of this Managing Committee will be members of the conference ex officio and the general conduct of the conferences will be held under its jurisdiction and, as stated above, presided over by its chairman.

Leading men interested in the gas industry will address the conferences on subjects of common interest. It is felt that to bring together men who will necessarily be leaders in their various groups into one meeting and to consider the various aspects of the industry together, the position of the manufacturers in the industry will undoubtedly be strengthened and that the results of such deliberations will come before the Executive Board of the American Gas Association with a much stronger backing than such problems have been presented in the past.

It is trite to mention the grievances and misconceptions which crop out in all industries from time to time. In a great many cases these conditions are brought about by a lack of thorough understanding between groups which should not brook misunderstanding and misinformation of this sort. Inasmuch as at the present time there are a number of important problems facing the gas industry, it is hoped that these conferences will eliminate a great many of today's vexatious questions. Naturally it is going to be impossible to accomplish as much as would be desired in the first instance. Only by interest in the common cause, and by constant cooperation among the men making up the conference will the Section be able to bring about the results which are so desirable at this time. It is felt furthermore that the deliberations of these conferences will have a very beneficial effect on that phase of the gas industry that is more or less outside of the utilities, and will bring to them a clearer insight into the objects of the American Gas Association. It is therefore hoped that when this plan is finally presented

to the manufacturers, it will receive their full-hearted support and in such cases where there is no group to work with, that individual companies will respond whole-heartedly in forming their group.

Requests for the selection of delegates will be sent out just as soon as details can be arranged, and with the support of all, the Manufacturers' Section feels that a great deal can be accomplished.

Coast Sales Conference

To Be Held February 24-25

THE first annual Pacific Coast Sales Conference, sponsored jointly by the A. G. A. and the Pacific Coast Gas Ass'n, will be held in Los Angeles, Cal., Feb. 24 and 25. Sessions will be in the Los Angeles Gas Auditorium, 810 South Flower St.

Among the subjects to be treated are:

"The Industrial Potential," by C. M. Grow, Southern California Gas Co.; F. H. Bivens, Southern Counties Gas Co., and J. H. Gumz, Pacific Gas and Electric Co.

"Natural Gas for Power," by F. H. Bivens, and Chas. Ferry, Southern Counties Gas Co.

"Getting Gas Into New Buildings," by F. M. Banks, Southern California Gas Co.

"Compensation of Salesmen for Rapid Load Building," by H. C. McAllister, Southern California Gas Co.

"Capitalizing the Blue Star," by J. W. West, Jr., A. G. A.

"Merchandising with a Punch," by J. E. Davies, The Peoples Gas Light and Coke Co.

"Color in the Kitchen," by Isobel Allobach, Southern Counties Gas Co.

"Successful Campaigns," by J. C. Gilbert, Southern Counties Gas Co.; J. S. C. Ross, Pacific Gas and Electric Co.; W. S. Dickey, Puget Sound Power and Light Co.; M. W. Gahan, Coast Counties Gas and Electric Co.

"Planning the Campaign," by C. H. Potter, Southern Counties Gas Co.

"The Manufacturer's Responsibility," by Frank Packer, Welsbach Co.

"What Can We Learn from Our Competitors?" by Frank Weiss, Los Angeles Gas & Electric Co.

"Meeting Electric Competition," by George Smith, Southern Counties Gas Co.; J. C. Douglas, National Refrigerating Co.; F. M. Banks, Southern California Gas Co.; F. V. Hayles, Pacific Coast Gas and Electric Co., and H. E. Seagraves, Tacoma Gas and Fuel Co.

"Meeting Oil Competition," by Chas. Robert, Los Angeles Gas and Electric Co., and H. L. Warren, Southern California Gas Co.

On the Firing Line of A. G. A. Activities

A Review of the Activities of the A. G. A. The Past, Present, and Future Months—High Spots in Brief and Otherwise

EVEN the casual reader of this issue cannot fail to be impressed by the importance and broad scope of the activities planned for the Spring. Leading everything else is the annual convention and exhibition of the Natural Gas Department at Dallas, Texas, the week of May 6th. This meeting will be the first meeting of natural gas men since the amalgamation of the Natural Gas Association of America with the A. G. A. A record attendance is anticipated, and advance indications point to one of the largest and best exhibits ever staged.

Announcement is also made in this issue of dates for two sales conferences and the distribution conference. Announcement concerning the annual production conference will be made in the March issue of the MONTHLY.

Laboratory Seal Is

Copyright in Canada

THE Copyright and Trade-Mark Branch of the Canadian Patent and Copyright Office, Ottawa, Canada, has issued to the Canadian Gas Association a certificate covering a specific trade-mark in the form of the A. G. A. Laboratory Blue Star Seal of Approval. This seal will be exactly the same as the Approval Seal in use in the United States, with the exception that the letters C. G. A. will be used instead of A. G. A.

The Canadian Gas Association is now ready to issue Laboratory Approval Certificates to manufacturers selling appliances in Canada. These Certificates will be the same as those the A. G. A. issues as far as appliance listing is concerned.

How the A. G. A. Voted

on the C. of C. Referenda

THE nine votes received from A. G. A. delegates on the U. S. Chamber of Commerce referenda were submitted in support of the recommendation in Referendum 50 for reduction in federal corporate income taxes. On Referendum 51, concerning Mississippi flood control, the A. G. A. vote was six "ayes" and three "noes" to the proposal that the federal gov-

ernment should pay the cost and assume responsibility for flood control in the Mississippi River; and the vote was seven to two on the recommendation that such control should be dealt with in legislation and administration on its own merits and not in connection with any other subject.

Distribution Conference to

be in Chicago, April 12-13

ANNOUNCEMENT has been made that the Third Annual Distribution Conference of the Technical Section will be held at Chicago, Ill., April 12 and 13.

M. I. Mix is chairman of the Distribution Committee, and will have charge of the program.

Our Growing Membership

AT the last meeting of the Executive Board six manufacturers, two associates, and 77 individuals were elected to membership.

Class "A" Homes Will

Have Association Support

THE American Gas Association is participating in a cooperative movement with the U. S. Department of Commerce for the adoption of national standards in home building for the purpose of certifying Class "A" homes. Application of the standards would, of course, be carried out locally. Among the participating organizations are:

- National Association of Real Estate Boards
- Architects Small Home Service Bureau
- National Association of Heating & Piping Contractors
- American Gas Association
- American Institute of Architects
- Common Brick Association
- Portland Cement Association
- National Lumber Manufacturers Association

Tile Manufacturers Association

It is proposed to hold a conference in Chicago in March next to be presided over by a representative of the Department of Commerce and on the program are provisions for

gas piping and approved gas appliances in the Class "A" homes.

Alexander Forward, managing director of the A. G. A., is chairman of the Joint Committee in the present preliminary stage.

A. G. A. To Participate in 1928 Steel Show

THE American Gas Association will participate in the 1928 exhibition and convention of the American Society for Steel Treating, which is to be held at Philadelphia, Pa., the week of October 8. It is anticipated that manufacturers and nearby gas companies will share in the participation, as in the past.

For the last two years the gas exhibit at the Steel Treating Show has been of record-breaking proportions. The 1928 gas exhibit will be of the same high standard.

'28 Spring Conference Dates Are Announced

THE annual Spring Conference of the Advisory Council and the Executive Board of the American Gas Association will be held at Atlantic City, N. J., June 1 and 2.

The following committee members will prepare the program for the conference: Chairman, D. D. Barnum; Chas. M. Cohn, and H. S. Schutt.

Plans for Next A. G. A. Convention Under Way

ASSOCIATION Headquarters is already at work on the 10th Annual A. G. A. convention to be held at Atlantic City, N. J., October 8 to 12.

H. W. Hartman and C. W. Berghorn, of Headquarters, visited Atlantic City recently to inspect progress on the Municipal Auditorium and to complete arrangements for the contract between the Association and the Atlantic City Convention and Publicity Bureau for the 1928 Convention.

As a result of this conference and subsequent conferences in New York, a formal contract has been drawn up and signed which provides not only for the facilities of the Municipal Auditorium, but grants the Association an option on the Million Dollar Pier to be taken up not later than July 1 in the event of impossibility of completion of the Municipal Auditorium. Under either arrangement ample facilities for exhibit space are available at a cost comparing favorably with former conventions held in Atlantic City.

J. M. Orts Lectures on Prone Pressure Method

THE Committee on Cooperation with Educational Institutions reports a lecture on artificial respiration was delivered by J. M. Orts of the Public Service Electric and Gas Company, at Rutgers University, New Brunswick, N. J., on January 3.

Mr. Orts demonstrated the application of the Schafer prone pressure method of resuscitation to an audience of 125, made up of students and faculties of Rutgers University, New Jersey School for Women, Rutgers Preparatory School and the New Brunswick High School.

Service Letters 75, 76 and 77 Prove Popular

INFORMATION Service Letters 75, 76, and 77 have proved especially popular.

More copies are now available, and quantity lots will be sold at cost.

The titles of these Service Letters are as follows:

No. 75: State Commissioners Approve Scientific Rate Making.

No. 76: Sweeping Decision by United States Court Rules That Gas Rates Must Not Violate Sound Allocation of Costs among Customers.

No. 77: Allocated Cost Gas Rates Work out to Entire Satisfaction of Customers and Company; Decree Entered in Niagara Falls Rate Case.

L. S. Stiles Honored

A PAPER entitled "Pipe Tunnel Under Gowanus Canal, Brooklyn, N. Y.," presented by L. S. Stiles, of The Brooklyn Union Gas Co., before a recent meeting of the American Society of Civil Engineers, has been awarded the distinguished Thomas Fitch Rowland prize by the directors of the A. S. C. E.

Gas Men Elected

AT the annual meeting of the American Petroleum Institute, held in Chicago in December, E. W. Clark, vice-president of the Union Oil Co., was reelected president.

Alexander B. Macbeth, president of the Southern California Gas Co., Los Angeles, and a former president of the A. G. A., was elected a vice-president.

Henry L. Doherty was elected a member of the Executive Committee of the A. P. I., and N. C. McGowen, of the Palmer Corp., Shreveport, La., and chairman of the Natural Gas Department of the A. G. A., is on the board of directors.

U. of Michigan to Report on Coal Researches

Vital Work on Coal at the University Is Sponsored by the Michigan Gas Association

By ARTHUR W. STACE

Director, Michigan Committee on Public Utility Information, Ann Arbor, Mich.

WHAT coal will yield the best results when used as fuel for the generation of water gas? What actually constitute the water-gas making properties of bituminous coal?

These two questions have long troubled practical gas men. The Chemical Engineering department of the University of Michigan hopes to have definite answers to them ready for presentation to the Michigan Gas Association when that organization holds its annual convention at Mackinac Island on July 5, 6, and 7, 1928.

And the Michigan Gas Association expects to pass the answers on promptly to the gas world in general.

The Michigan Gas Association will be first to receive the report because it is through its enterprising generosity that the engineering research department of the University is enabled to carry on the special intensive study that aims at securing authoritative answers. The questions form the subject matter of the first investigation made by the department under the terms of the recent gas research fund of \$10,000 and upwards established at the University of Michigan by the Michigan Gas Association.

The study is being made by Assistant Professor Elmore S. Pettyjohn, who was chosen as research investigator upon the establishment of the fund at the beginning



AT the left is shown Prof. Alfred H. White, head of the Chemical Engineering Department of the University of Michigan. At the right is Assistant Professor Elmore S. Pettyjohn, research investigator employed at the University through the gas engineering research fund provided by the Michigan Gas Association. He is now engaged under the direction of the Chemical Engineering Department of the University working out, at the Marysville gas plant of the Detroit Edison Co., the problem "An Evaluation of Bituminous Coals as Water Gas Generator Fuel."

of the present university year. He is being assisted by David A. Fox, holder of the 1927-28 Michigan Gas Association fellowship at the University of Michigan.

The official designation of Assistant Professor Pettyjohn's study is "An Evaluation of Bituminous Coals as Water Gas Generator Fuel." Mr. Fox's part in the study will concern itself largely with the analysis of gases.

The study will be carried on at the Marysville gas plant of the Detroit Edison Company, which is co-

operating heartily in the work. The Marysville plant is particularly adapted to the investigation as it is making straight water gas. It will be possible to isolate the gas made by one machine. This will enable the research staff to maintain standard conditions for the tests of various coals, and thus eliminate the variables encountered in making tests in different plants and often in the same plant under the customary changing conditions of manufacture.

There are about a dozen recognized bituminous "gas" coals used in the manufacture of water gas. There are other bituminous coals which for one reason or another apparently cannot be used in the process.

About 95 per cent of the standard "gas" coals come from West Virginia



F. W. Steere

F. W. Steere, New York, N. Y.

THE Fellowship Committee of the Michigan Gas Association is composed of the following:

James A. Brown, Jackson, Mich.

John W. Batten, Detroit, Mich.

Dan W. Hayes, Port Huron, Mich.

Chas. R. Henderson, Ann Arbor, Mich.

F. W. Seymour, Battle Creek, Mich.

and Kentucky. The remaining five per cent come from Pennsylvania, Indiana, and Illinois.

Assistant Professor Pettyjohn expects to make tests of six or more of the leading "gas" coals before June. All will be put through the same routine under practically identical conditions. The records will be compared to see which coal yields the best results, all phases of gas manufacture being taken into consideration.

The study, however, will go farther than trying to determine the comparative gas-making qualities of the various coals. It will seek to find the reason why one coal is better than another. In other words, it will endeavor to establish definitely what constitutes the gas-making properties of bituminous coal. The isolation of these properties may go far in helping research engineers and gas men solve practical problems involved in the manufacture of their product.

Enterprising gas men have, of course, made occasional tests of various coals, seeking the one that would yield the most efficient results at the least cost in their particular plants. At the best, however, these tests have been inconclusive. Their findings have not been definite and of general application. It is hoped to make the present study so thorough and with such high regard for accuracy that the conclusions will have scientific definiteness and authority.

The investigation is being made on a

strictly impersonal basis, it is asserted, and the different coals will be considered on their merits.

Elmore S. Pettyjohn, research investigator, received his bachelor's degree from the University of Michigan in 1918, just before entering war service in the U. S. navy. Industrial service with the Semet-Solvay Company and the Ford Motor Company followed. He returned to the University and received his master's degree in 1922. He entered the employ of the Illinois Steel Company and later joined the staff of the Chicago By-Products Coal Company, which he left when tendered the new post at his Alma Mater. The board of regents of the University of Michigan made him an assistant professor at their February meeting.

The initial problem "Evaluation of Bituminous Coals as Water Gas Generator Fuel" will be followed by a study of "The Means Available for the Dehydration of Manufactured Gas."

The chemical engineering department of the University of Michigan under Prof. Alfred H. White and in cooperation with the Michigan Gas Association has been actively engaged for many years in working out gas problems and in preparing young men to enter the gas industry. The fellowship in gas engineering was established by the Michigan Gas Association more than a quarter of a century ago—in 1900. It was both the first fellowship ever instituted in gas engineering and a pioneer among industrial fel-



Gas Engineering Building, where U. of Michigan Chemical Engineering Dept. is located

lowships. It has been maintained constantly except during the World War, when the two young men to whom it was awarded entered the United States military service.

Last year the fellowship research funds were spent in testing the process for instantaneous carbonization of coal on a large scale. The work was carried on at Ohio State University in the full sized vertical retort which is available there.

One of the discoveries in these tests was that pulverized coal could be used in making water gas, but that the coke formed in the process was in fine grains—too fine, indeed, to make the coke available in the house heating fuel market. Just now, the sale of coke is an essential factor in the profitable manufacture of gas. There may come a time, however, when electrical generating and gas producing plants can be combined with mutual benefit and the instantaneous carbonization process may then become of importance. This would involve the use of the granulated coke by the power plant.

The fellowship for 1928-29 is now awaiting candidates. It is open to graduates of any college or university. Applications will be received up to March 1, and the award of the fellowship will be announced about April 1.

The chemical engineering department of the University of Michigan has just issued a new bulletin presenting the graduate courses in general chemical engineering, metallurgical engineering, gas engineering, and organic chemical industries.

The courses in gas engineering are particularly emphasized by Prof. Alfred H. White, head of the chemical engineering department. They include courses in "Fuels and Furnaces," "Chemical Technology of the Inorganic Industries," "Chemical Technology of the Organic Industries," "Unit Processes," "Principles of Chemical Engineering," "Evaporation, Filtration, and Transportation of Liquids," "Equipment and Processes for Drying, Distillation, and Extraction," "The Man-

ufacture of Illuminating and Fuel Gases and Motor Fuels," "Furnace Design and Construction," "Research Relating to the Manufacture, Properties and Uses of Coal Gas, Water Gas, Oil Gas, and Producer Gas."

The gas faculty of the chemical engineering department of the University of Michigan includes Prof. Alfred H. White, Prof. W. L. Badger, and Prof. E. H. Leslie. Assistant Professor Elmore S. Pettyjohn will be occupied entirely in research, although he will be in charge of students, assisting in his work.

Prof. White has been with the department of chemical engineering since its organization in 1897 and is now at its head. He had personal charge of the work in gas manufacture until the beginning of the war. He entered the army in May, 1917, and was assigned to the nitrate division. When discharged as lieutenant colonel in the ordnance department, he was associate chief of the nitrate division. He is the author of "Technical Gas and Fuel Analysis" and of numerous books and papers.

Prof. W. L. Badger is a specialist on chemical engineering machinery.

Prof. E. H. Leslie is a graduate of the course in chemical engineering at the University of Illinois, with later work at Columbia University. He was chief chemist for the General Petroleum Corporation, in which capacity he originated several processes for cracking petroleum, including the method of producing toluene from petroleum which was adopted by the United States Government during the war.

In addition to the research work at the University of Michigan sponsored by the Michigan Gas Association, Walter E. Jominy, research investigator, is working in the research department under the auspices of the American Gas Association on a study of "Utilization of Gas in Steel Forging." In this study the University is linked up closely with both the gas industry and with the automobile industry, which is vitally concerned in the subject of heat treating.

United Engineers and Constructors, Inc., Formed



D. P. Robinson

THE largest engineering and construction company in this country has been organized in Philadelphia, according to a statement issued by Arthur W. Thompson, President of The United Gas Improvement Company. "Four firms, widely known in this and other countries, have combined their interests and organized the United Engineers and Constructors Incorporated," said Mr. Thompson. "These companies are The U. G. I. Contracting Company, Philadelphia; the Public Service Production Company, Newark; Dwight P. Robinson & Company, Inc., New York, and Day & Zimmerman Engineering & Construction Company, Philadelphia. Headquarters of the new company will be in Philadelphia, with offices in New York, Newark, Chicago, Los Angeles, Atlanta, Houston, Pittsburgh, Montreal, Buenos Aires and Rio de Janeiro."

Dwight P. Robinson is President of the company. The directors are Arthur W. Thompson, President, The United Gas Improvement Company, chairman; Dwight P. Robinson; Thomas N. McCarter, President, Public Service Corporation of New Jersey; Samuel T. Bodine,

chairman, Board of Directors, The United Gas Improvement Company; Paul Thompson, a vice-president of The United Gas Improvement Company and President of the Philadelphia Gas Works Company, and John E. Zimmerman, President of Day & Zimmermann, Inc.

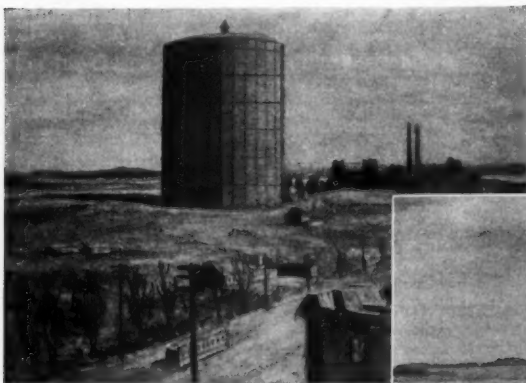
The new company is launched with contracts in hand amounting to more than \$100,000,000.

American Gas Journal To Publish Advertisements

STANTON G. KRAKE has offered to publish the industrial gas advertisements of the American Gas Association free of charge in the *American Gas Journal*. The Industrial Gas Section has accepted Mr. Krake's offer, and a vote of thanks was extended to him at the recent meeting of the Managing Committee.

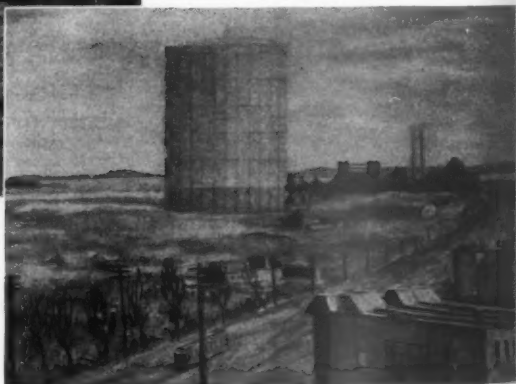
New Orleans Will Get Natural Gas Service

PLANS have been made for transporting natural gas from the fields of Northern Louisiana to serve New Orleans. The service will be from the New Orleans Public Service Inc., the gas fields being those acquired some time ago by the Electric Power and Light Corporation from the Gas By-Products Company. The amount of gas available for New Orleans will be about 25,000,000 cu.ft. a day.



At the right is shown the same gas holder after camouflage colorings had been applied. The holder blends with the ground and the sky, in marked contrast to its former appearance

The Hunts Point waterless gas holder of the Consolidated Gas Company of New York as it appeared before being painted to harmonize with its surroundings. This is from a landscape painting



Gas Will Be Supreme in 1977

Next Fifty Years Will See Real Development of the Gas Utility

By SAMUEL REA

Retired President, The Pennsylvania Railroad

IT is my own guess some of the most notable achievements of engineering in the next fifty years, perhaps overshadowing all others in importance, will have to do with the conservation of our natural resources, particularly in the direction of eliminating waste in the use of fuels and in recovering and utilizing more completely the by-products of distillation and combustion.

We are all familiar with the predictions and estimates that our supplies of oil and anthracite coal are doomed to exhaustion in a few decades. If this is so, where will we stand in 1977 for these fuels? We believe that we have bituminous coal in sight for several centuries, but we need more than this and every effort of the country's best engineering minds is needed to restrict the waste of our valuable heat and power producing commodities.

Sometime in the future, perhaps by 1977, if not earlier, we may conceive that all small and inefficient plants will be closed down and heat and power obtained from central plants where production costs are at a minimum. Certainly this is both possible and practicable in cities and even in closely settled suburban or country districts.

The utilization of fuels is a specialized branch of engineering. Fuels are des-

THIS material is an abstract from an address by Mr. Rea before the Engineers Club of Philadelphia on the occasion of its 50th birthday. In his speech he mentioned that in comparison with the thousands of years of knowledge and experience upon which the present structure of engineering has been built up, 50 years, looking forward, may not seem a long time.

In his mind, however, the rate of progress today and the development of science and its application to practical uses are so swift as compared with earlier periods, that the next 50 years may well bring about changes as revolutionary as those which have occurred in the past 50 years.

Mr. Rea paints a vivid picture ahead for the gas industry. Those who would dismiss his predictions as idle dreams are requested to turn their memories back to 1877 when gas was used primarily for lighting. Can any change in the next 50 years parallel the change of the past 50?—Editor.

tined to become so valuable to the human race as a whole that they will be placed only in the hands of those who can to the greatest advantage control their combustion. Scarcely anything is more archaic in our civilization, or more wasteful in the eyes of the economist, than our individual house heating systems, in which all but a small fraction of the potential heat of the fuel is dissipated upon the outside atmosphere.

The gas business, as a public utility, will supply practically

all heat distribution in urban localities. As capital cheapens, it will become possible to construct distributing systems furnishing cheaply produced gas for house heating purposes as well as cooking. Industries in many cases will similarly be supplied with gas for fuel instead of burning coal in individual furnaces under boilers. We may then realize the smokeless city, and added sunlight will greatly improve the health of urban dwellers.

Hand in hand with the extension of gas will, of course, go the increased utilization of electricity and this will be of particular importance in the rural districts where the introduction of gas will necessarily be at a slower rate than in settled communities. The harnessing of our rivers by 1977 will doubtless have progressed a considerable way toward

utilization of their potential horse power. We may also expect to see, in highly developed form, vast power distributing plants situated near our coal mines, effecting a tremendous saving in demands upon our transportation resources, which will be required for other purposes. Inter-connection of power lines to distribute loads and diversify sources of supply has almost unlimited possibilities, and the more nearly we can balance the load the more efficient will be the production and distribution of electric power.

Electricity for house heating, I think, will not develop materially except in a very few localities where exceptional circumstances make the production of power abnormally cheap. For general purposes,

gas will be the more efficient and economical source.

Where coal is directly used for industrial fuel, we may expect to see it applied chiefly, if not entirely, in pulverized form, sprayed pneumatically into the fire box. Increasing quantities, however, will be subjected to the process of gas production, so that the products of destructive distillation may be recovered for laboratory purposes and make possible the further extension of our synthetic chemistry. By 1977 the reactionary properties of practically all the elements will be known and the chemist will be able to produce artificially, at will, a vastly increased number of substances useful in every art.

As Others See the Future of Gas

COMMENT on the gas industry in the newspapers and general magazines is growing in quantity, and is also of an increasingly favorable nature. During January the annual statistics released by the American Gas Association were given nationwide distribution, as was also a forecast and review by President O. H. Fogg.

Prominent among the annual statements released by the executives of the utility industry to the newspapers were those by Phillip G. Gossler, President, Columbia Gas and Electric Co.; George N. Tidd, President, American Gas and Electric Co.; B. J. Mullaney, vice-president, The Peoples Gas Light and Coke Co., and vice-president of the A. G. A.; Henry L. Doherty, President, Cities Service Co.; John J. O'Brien, President, H. M. Bylesby and Co.; Arthur W. Thompson, President, The United Gas Improvement Co., and others.

"Approved Gas Ranges" is the title of an article in the January issue of *Good Housekeeping*, by Arthur J. Donniez, research engineer of the magazine's Institute. The article explains the careful examination and tests made of gas ranges that meet the *Good Housekeeping* Institute approval, and says in part:

"Modern gas ranges represent some outstanding developments in construction during rather recent years.

"In checking the construction of each range

we follow the requirements of the American Gas Association, a national organization of gas appliance manufacturers, gas companies, and representatives of allied industries. A range built in accordance with these specifications represents the best range practice. When a range has been approved thus, you may feel confident that it has been very thoroughly examined and should prove satisfactory in every way."

A booklet entitled "The Public Utility Industry," issued by Pynchon & Co., mentions the development of the utilities during recent years.

The gas industry receives very favorable comment. Figures supplied by the A. G. A. are quoted to show the growth the industry has enjoyed in the past few years. The developing of new uses and the extension of sales are mentioned.

The *Industrial Bulletin* of Arthur D. Little, Inc., Cambridge, Mass., has an interesting item on the dry quenching of coke at the Rochester Gas and Electric Corp., Rochester, N. Y., and another on "Public Service Indirectly," in which it is pointed out that "an interesting phase of the rapid growth of utility systems is the large and capable technical staffs which so many of them maintain."



T. H. Kerr



T. R. Weymouth



Wm. Moeller, Jr.



R. P. Anderson



E. O. Bennett

© Blank & Stoller
F. M. Towl

H. D. Hancock



M. E. Benesh



R. W. Hendee



E. L. Rawlins



E. F. Schmidt



E. A. Clark

THE Gas Measuring Committee and the Committee on Pipe Line Flow of the Natural Gas Department of the A. G. A. are actively at work on pressing problems.

Important Natural Gas Committees

Forest M. Towl, New York, N. Y., is chairman of the Gas Measuring Committee. The personnel consists of Dr. Edgar Buckingham, Washington, D. C. (representative of the Bureau of Standards) and H. C. Cooper, Pittsburgh, Pa., who are not shown above. Those whose pictures appear are: T. R. Weymouth,

Buffalo, N. Y.; Dr. R. P. Anderson, New York, N. Y.; H. D. Hancock, Kansas City, Mo.; T. H. Kerr, Columbus, Ohio; Wm. Moeller, Jr., Los Angeles, Cal.; E. A. Clark, Tulsa, Okla.; E. O. Bennett, Fort Worth, Texas; M. E. Benesh, Chicago, Ill. H. D. Hancock is chairman of the Committee on Pipe Line Flow, and E. A. Clark is also a member of this committee. The others are: E. F. Schmidt, Dallas, Texas; E. L. Rawlins, Bartlesville, Okla. and Robt. W. Hendee, Okmulgee, Okla.

From the Mail Box



CAPITAL CITY GAS COMPANY

Montpelier, Vt.,
December 22, 1927.

AMERICAN GAS ASSOCIATION,

In the late flood of November 3-4 our office was 9' 10" under water and at the plant was within 10" of the top of top retort. At the office the windows were broken and everything moveable went out including desks, chairs, file cases, and books. Among them the Gas Association's past reports. Have you extra copies of these? If you do, will you please send us a set with bill for same.

Yours truly,
Capital City Gas Company,
Geo. L. Blanchard, Treas.

P.S. With all our trouble from the flood there has not been a day we have not furnished service somewhere in the City.

G. L. B.

AMERICAN GAS ASSOCIATION

December 27, 1927.

DEAR MR. BLANCHARD:—

Man combating the forces of nature always wages a terrible battle under severe handicaps. The hearts of everybody were with the people of Northern New England in their fight for existence during the recent devastating flood.

Your postscript "With all our trouble from the flood there has not been a day we have not furnished service somewhere in the City" expresses a great deal. The tradition of the gas industry to supply service under all conditions was upheld. We in the gas industry can perhaps better appreciate the sacrifice and risk involved but even we, away from the scene, cannot fully realize the full significance of it. The American Gas Association is proud of its member company, the Capital City Gas Company of Montpelier, Vermont.

Your request for a renewal of files of A. G. A. reports signifies a return to normalcy. We are sending a box of literature to you with the hope that your company will accept them as our small share in helping to refit your office.

Very sincerely yours,
Alexander Forward,
Managing Director.

Big Empire Line From Texas Is In Service Now

KANSAS City and other cities which receive gas from The Cities Service Gas Co. are now burning gas from the vast Amarillo, Tex., Panhandle field.

Westchester Lighting Co. Honors Nineteen Employees



T. J. De Kay

THIRTEEN employees of Westchester Lighting Company and its affiliated companies were honored on completion of 25 years of service, two employees were awarded medals for meritorious service during the year, and four others were given honorable mention at the annual general meeting of the Company's Quarter Century Club, held in Mount Ver-

non, N. Y., January 16.

Eugene H. Rosenquest, President of the company, paid tribute to the loyal spirit of the thirteen new members of the Quarter Century Club in awarding the service button.

Those who were received into the club were: J. D. O'Connor, A. A. Halley, T. A. Connors, F. C. Eckert, L. V. Snyder, J. B. McCarthy, J. J. Baker, H. N. Baker, E. P. Prezzano, vice-president, E. McGovern, Earl E. Fink, Patrick Smith, and James Ireland.

Alexander Forward, managing director, A. G. A., stressed the value and importance of the study of methods of resuscitation among employees, and awarded the McCarter Medal, given for resuscitating victims of asphyxiation, to Thomas DeKay, of Port Chester. Honorable mention was given to Robert Richards of the same department. The Meritorious Service Bronze Medal was awarded to Edward Lewis, foreman of the White Plains District. Honorable mentions were accorded to Jacob Sontag, Einar Thumberg, and Raymond Chadwick, of the White Plains district.



General view of open hearth pouring floor at the Fordson plant



Pouring slag from furnace into slag car in the steel mill

Gas Plays Major Role in Making New Ford

From Four to Five Hundred Furnaces and Heating Processes Depend on This Fuel

By J. B. NEALEY
American Gas Association



J. B. Nealey

MASS production was made possible by automatic machines, but it was not until automatic heating and heat treating units were perfected that the great possibilities of the mechanical era were realized. Automatic gas furnaces, performing an almost unlimited range of heating processes, are today synchronized nicely and exactly into straight line mechanical production.

The Fordson (formerly River Rouge) plant of the Ford Motor Company offers one of the greatest examples of what can be accomplished in this line. The new car, which this plant is turning out, is typical of what can be done with engineering brains, correctly applied, automatic machines correctly designed, and automatic heating units efficiently fueled.

The vast majority of the heating and heat treating operations in this plant are on gas and approximately 50,000,000

cu.ft. of this fuel is consumed every day. The gas is piped to a compression room, raised to 15 pounds pressure, and delivered to the various parts of the plant where it is utilized.

Steel making is probably the first process in which gas is used. There are seven basic open hearth furnaces each of which is 70 ft. long by 22 ft. wide and of 100 tons capacity. The checkers or regenerators occupy the 25-ft. space between the charging and ground floors. A gas burner with a five-in. water cooled nozzle fires directly above the hearth from either side.

Every fifteen minutes one burner is automatically shut off and the other lighted, the waste heat being forced by the draft across the hearth and down through one of the regenerators, where it imparts much of its heat to the brick checkers, and then out through a waste heat boiler and stack. Fresh air for combustion is drawn in through the other regenerator and by the time it passes the burner nozzle and mingles with the gas, it is hot enough so as not to cool the hearth materially. It requires from six to seven hours to bring the temperature



Furnaces for annealing transmission gear stock up to 2900 or 3000°F. and the steel is ready for pouring in 11 to 13 hours.

While the parts of the new car are machined so accurately as to reduce vibration to a minimum, they are also heat treated for marathon endurance.

The main heat treating department, one of the largest in the world, includes 40 cyanide furnaces, 19 continuous furnaces and six periodic furnaces, as the principal installations, all fired with gas. The temperatures of these units are continuously maintained with automatic pyrometric controls and the accuracy of these is constantly checked in a central control room. In this room are located 66 recording pyrometers, on two wall boards, holding 33 each. These recording instruments are direct connected with couples in the various furnaces and ink out a line on the charts showing the fluctuations during operation. A variation of more than three degrees either way is not tolerated in the continuous and periodic furnaces although a somewhat larger swing is allowed for the cyanide units.

The heat treating equipment, to simplify the description, can be divided into batteries and single units according to type and class of work. Annealing and normalizing is accomplished in a group of six continuous and automatic furnaces each of which is 24 ft. long, 8 ft. wide and 6 ft. high, built of brick and suitably insulated. Alloy steel rails are laid on the hearth and the work, consisting of gear

blanks, cam shafts, etc., is propelled through with a mechanical pusher.

This pusher is actuated by a cam, and a variable speed transmission controls the pusher impulses, so that the work remains in the furnace the exact heating period specified. The hearth extends five feet beyond the charging end to facilitate in loading. There are six burners equipped with inspirators which automatically proportion the gas-air mixture for complete combustion and the proper furnace atmosphere. These burners are all located in the first third of the furnace, three on each side, and close to the loading end.

In this heating zone, temperatures of from 1,500 to 1,650 deg. F. are maintained, and this drops gradually until it is only 1,150 deg. at the discharge end. The heating periods vary, according to the class of work, from six to eight hours. Each of these units will heat 20,000 pounds of work in 24 hours.

The hardening of such parts as the crank shafts, connecting rods, and caps, gears, etc., is accomplished in a battery of 12 continuous and automatic furnaces, six for hardening and the remainder for the draw. These units are of brick 18 ft. long, five feet wide and six feet high and are underfired with three gas burners, located in the charging end, provided with inspirators.

The work, loaded onto plates, is pushed through on rails by a mechanical pusher, correctly timed, and automatically discharged into a water quench. This is contained in a steel tank, equipped with a flight conveyor which lifts the work up and out, and an operator loads it on to



The new Ford car

the hearth of the drawing furnace. A covered chute into the tank forms a water seal to prevent cold air from entering the furnace at this point. The drawing furnaces are exactly like the hardening units, and the work is discharged into wheelbarrows and loaded into tumblers, ground, Brinnell tested and trucked to the machine shop.

The hardening furnaces are maintained at from 1,470 to 1,590 deg. F., and the drawing units at from 600 to 1,200 deg. F., according to the class of work. The heating periods for each of these operations range from 45 minutes to one and a quarter hours. As these units are in tandem, the work passes through continuously, and, except for the charging after the quench, automatically.

The cam shaft is treated in a continuous furnace 14 ft. long and five feet square, in cross section. This unit is equipped with a mechanical pusher and is designed for side door discharge. It has two burners and inspirators, located at the discharge end, and the work rides through on rails laid on the hearth.

The shafts, when up to heat, are removed by an operator with tongs and put into a quenching machine, designed to prevent warping. It consists of an upright cylindrical tank, containing three vertical bars with sets of rollers, which are clamped around the shafts to hold them straight while water is sprayed onto them.

There is no draw for this particular piece of work. The hardening furnace is heated to 1470°F. and the work remains in it 45 minutes. The output of this unit is 400 cam shafts in eight hours.

Piston pins are carbonized to produce a .0044-in. case in a furnace 30 ft. long, eight feet wide and six feet high. It is equipped with rails and the work is pushed through, in boxes, by a mechanical pusher. There are 20 gas burners and inspirators, which produce a temperature of 1750°F. and the work is subjected to this heat for six hours.

The pins are packed in nichrome steel

boxes, 52 pins to a box, together with carbonizing material, and a chain falls is provided for loading and unloading. When discharged, they are set aside to cool and the pins are then unpacked and hardened in cyanide.

The cyanide is carried at 1600°F. and the pins are heated for a period of six minutes, when they are water quenched.

For hardening transmission gears, differential pinion gears, etc., which have been finished machined, a battery of 20 cyanide furnaces, all gas-fired, is used. There are two sizes of pot, one which is 16 in. in diameter and 25 in. deep, and the other, 25 in. in diameter and 20 in. deep. These are set in circular brick foundations, hooded to remove fumes and fired with one gas burner and inspirator each.

A device for holding the gears in suspension in the heating fluid consists of a specially designed wheel or frame held parallel to the fluid surface and just above it. The gears are strung on short rods ending in hooks and these hung on the wheel. Each pot and wheel will accommodate 16 such hooks. In other pots the work is simply loaded in, a batch at a time.

These pots are held at 1500°F. and the work is heated from six to fifteen minutes, depending upon its characteristics. In this operation cyanide was chosen as a heating medium to prevent scaling and not for case hardening.

A steel quench tank is provided for every two cyanide furnaces. Some of these quenches are provided with frames, on which the work is hung, and the frames are given a rotary motion, about a horizontal axis, to produce agitation. The temperature of the oil in these quenches is kept down by recirculation through coolers. A furnace 22 ft. long, provided with a chain conveyor, is used for the draw at 600°F. and for 1¼ hours.

Miscellaneous parts such as spindle pins, steering arm balls, etc., are treated in a battery of five cyanide furnaces fired with one gas burner each. Some of this work is drawn in oil or nitrate baths

after a water quench. The drawing mediums vary in temperatures from 450 to 800°F., according to the class of work.

Clutch plates are treated in a group of four gas-fired cyanide furnaces, at a temperature of 1600°F. and for a period of five minutes. To prevent warping a quenching machine is provided which holds each one tightly between jaws while being sprayed and then automatically ejects them. This work receives no draw.

A single cyanide furnace is provided for the worm gear, which is heated to 1470°F. for 20 minutes. These gears weigh 22 pounds each and are treated in batches of ten. They are then water quenched, the time limit being 40 seconds to prevent cracking, and drawn in oil heated to 450°F. In another section of the plant is a group of 66 gas-fired cyanide pots for case hardening gears, brake drums, transmission discs, clutch fingers, etc.

The main ring gear is annealed in a unit 23 ft. long, and eight feet in cross section. This is fired with two gas burners and one inspirator on each side located close to the charging end so as to provide both a heating and a cooling zone.

A seven-foot charging table, rails, mechanical pusher and indicating pyrometers are a part of the equipment of this unit. The rings, which are eight inches in diameter, are piled onto trays, 45 to a tray, and the trays pushed through the furnace at the rate of six per hour. The hot zone is maintained at 1640°F. and it takes the work five hours to travel through.

Many other gas heating and heat treating processes are scattered throughout the plant ranging from the steel mills to the glass plant. There are between 400 and 500 furnaces and heating processes in which gas fuel is used.



Only Blue Star Laboratory approved appliances were shown at the first annual Builders' Exposition of Southern California at Los Angeles recently. The Southern California Gas Co., the Los Angeles Gas and Electric Corp., and the Southern Counties Gas Co. cooperated

How to Convert Consumption and Revenue Decreases Into Increases

By FRED KARR

Director, Public Relations, Gas Service Co., Kansas City, Mo.

THE New Business Department of the Wichita Gas Company has vindicated Henry L. Doherty's new business policy. When Mr. Doherty first inaugurated his new business policy, he stated that he was willing to pay one dollar for new business expense necessary to add one dollar of additional gross revenue. Mr. Doherty's theory was that the load once added continued for years and consequently paid back big dividends on the investment.

From recent operations of the New Business Department of the Wichita Company the wisdom of Mr. Doherty's theory has been demonstrated conclusively. Every dollar of additional gross revenue has been obtained at Wichita for a small new business expense of about 25 cents. There has been some doubt whether or not this new business policy was based on sound business practice, but operations and results obtained have convinced any doubters that Mr. Doherty's scientific methods were superior to other theories and opinions.

Jess Tooker is New Business Manager of the Wichita Gas Company, one of the Doherty companies which comprise The Gas Service Co., a group of gas properties in Kansas, Missouri, and Oklahoma.

Two and one-half years prior to the inauguration of the Doherty New Business Department, at Wichita, in July, 1925, when this company was in the hands of its former owners, the annual sales per customer decreased from 98,000 to 60,000 cu.ft. and the revenue per customer dropped from \$66.71 to \$52.50, showing a total loss in gross revenue of \$226,560 per year. This happened regardless of the fact that 2200 customers had been added during this period and that there had been no change of rate.

The activities of the New Business De-

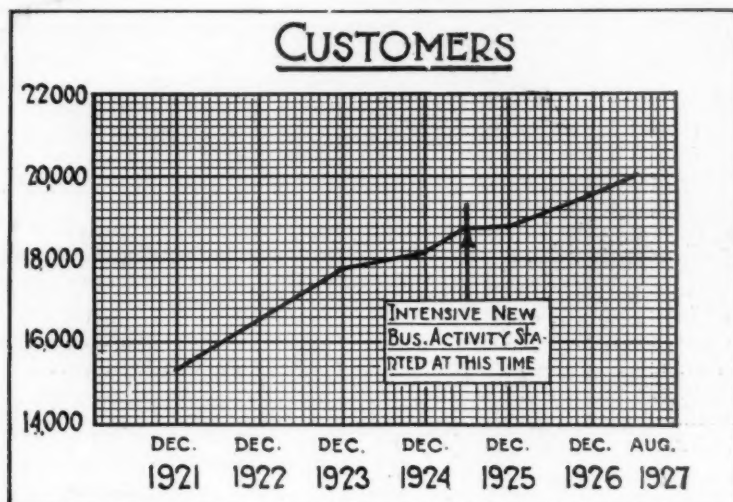
partment show the following result: The total domestic consumption for the 12-month period ending August, 1927, as compared to the 12 months' consumption for the period ending June, 1925, immediately prior to our taking over the operation of the Wichita Gas Company, shows an increased annual revenue of \$314,213. In other words, an annual decrease in sales per customer of 11.6 per cent has been converted into an annual gain of 13.8 per cent, although 1328 customers have been added since June, 1925, and again there has been no change of rate.

During this 26 months' period approximately \$520,000 have been added in gross revenue with the expense of about \$130,000, or about 25 cents of new business expense for every dollar of increased gross revenue.

Through aggressive new business activities there is every reason to believe that the forecasted consumption figures will have reached 96,000 cu.ft. per customer by the end of 1928.

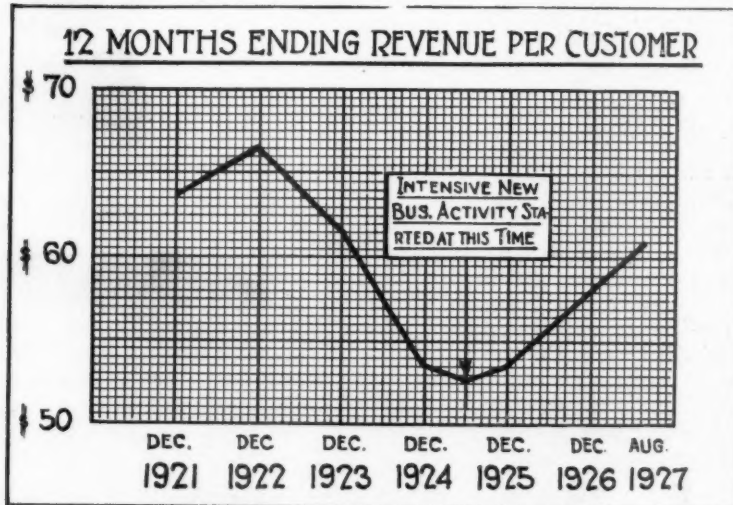
In this day of competition and changing living conditions business does not just grow itself. It requires intensive, aggressive salesmanship to get your share. While utilities seem to act as monopolies, they are really in competition for their share of the dollar to be spent. For instance, a survey of the field in Wichita showed that more than 2500 oil burners had replaced many cheap and inefficiently constructed gas burners in the furnaces of our customers, which accounted largely for the decreasing revenue of the company.

The tendency of the times toward removing the drudgery of housework in the home as evidenced by the increased sale of pre-cooked and canned foods, the phenomenal growth of the baking and laundry business, and the steady increase



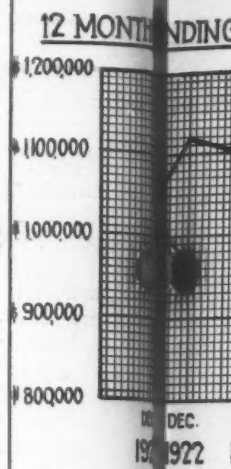
GRAPH NO. 1

Graph No. 1 shows the number of customers that have constantly been added at the Wichita Gas Company. Graph No. 2 shows how the annual revenue of the company has increased from the time intensive New Business activities were started. Graph No. 1 shows that the increase in the number of customers has been fairly steady but a comparison of No. 1 and No. 2 shows that while from December, 1922, to July, 1925, the number of customers in-

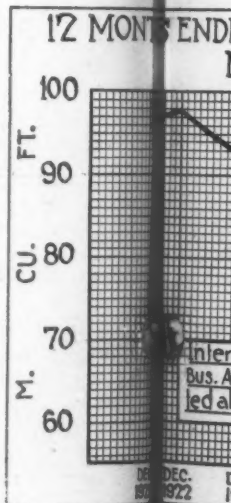


GRAPH NO. 3

This graph shows the change that has been made through these new business activities on the revenue per customer basis. Previous to the time these activities were started in the Wichita Gas Co., before July, 1925, the revenue per customer dropped from \$66.71 to \$52.50, a total loss in gross revenue of \$226,560 per year. This happened regardless of the fact that 2,200 customers had been added during this period and there had been no change in rate.

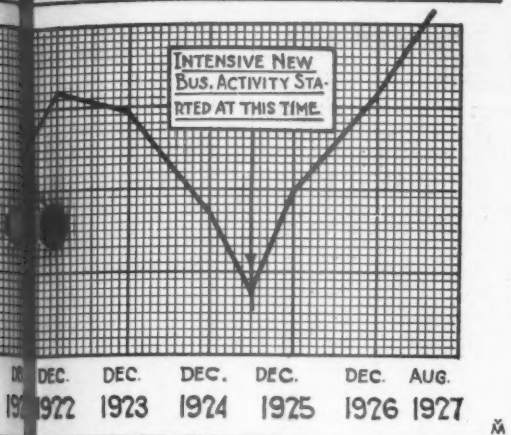


creased from approximately 16,000 to approximately 20,000 in 1925. From July, 1925, on an extensive campaign and while customers continued to increase, the revenue decreased from approximately \$1,100,000 to about \$800,000.



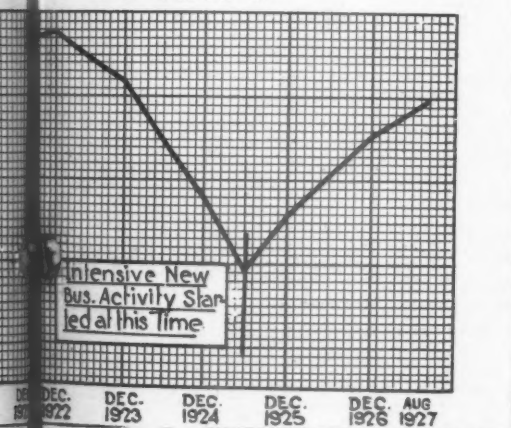
The above graphs show how the revenue per customer has steadily increased since the Doherty New Business Department was taken over in 1922, until July, 1925, when the revenue per customer was about 98,000 to 100,000 cubic feet.

ENDING TOTAL ANNUAL REVENUE



GRAPH NO. 2

approximately 16,500 to 18,800, the annual revenue dropped to less than \$900,000 in July, 1925, the time that the New Business activities were started and while the rate of increase in the number of customers about the same proportion as in previous period, the revenue ceased at this time and started to increase.

ENDING SALES PER CUSTOMER
M. CU. FT.

GRAPH NO. 4

shows how the 12-months ending sales per customer per year steadily increased since the inauguration of the Department at the Wichita Gas Co., in July, 1925, were taken over. Previous to this time, from December, 1922, sales per customer showed a decided drop, falling from 1.5 cubic feet.

in the number of apartment houses, restaurants, and cafeterias have unquestionably been potential factors in decreasing the revenue of the company. An average of five cu.ft. of gas is required to bake a loaf of bread in the home. This same loaf can be prepared in the modern bakery with one cu.ft. of gas. In brief, sales per customer had been decreasing over the period at the annual rate of 11.6 per cent.

It requires systematic and organized effort of a competent sales organization to promote such activities as house heating and water heating which are the main sources of our increased revenue. Such activities are of necessity expensive, because, although they increase the sale of gas, they pay very little in return for the effort through the sale of merchandise appliances. Ranges, for instance, may be sold with the proper sales organization, at a profit, but ranges really decrease gas sales because these modern appliances utilize gas in the most efficient and economical way possible. They produce customer satisfaction, for which we also strive, but they do not increase the gross revenue when they are merely replacements.

During the 26 months' period an average of twenty-one representatives and engineers have placed on the lines of the Wichita Gas Company a total of 5798 gas-consuming appliances. A total of 1432 separate extension projects were surveyed, each involving from one to 125 customers. Two hundred and eighty-two main extensions were sold, requiring and securing the connection of 592 customers. Within the period there were also connected 486 customers, which represented dead services on the present mains and which required no additional investment on the part of the company to connect.

(Continued from page 70)

factors for each particular case. Any prediction that all manufactured gas will eventually be produced at or near the coal mines and be conveyed to the centers of use—however remote the distance—cannot be made without completely disregarding these fundamental determinants.

On the one hand, we would establish huge producing plants in coal mining regions, realizing thereby large economies in the transportation cost of gas-making materials, but we must transport the gas instead. If we were to employ the processes most efficient for the use of these materials, we would produce large quantities of the residual coke and other by-products; but these would have to be carried to their markets. In considering the added investment in new production plants and in transmission facilities, pressure reinforcing stations and equipment needed to deliver the gas to the distant centers of use, we must also take into account the amortization of abandoned plants and the cost of maintaining and operating the pumping equipment and transmission mains. On the other hand, there will undoubtedly be cases where, between the producing area and the delivery terminal, there will be many smaller communities to which gas could be piped from these main lines and a substantial volume of new business secured.

This development is one which is being actively advocated at the moment in the proposal to transmit coke oven gas from the Ruhr district to the principal cities and towns of Germany.

However, we are less concerned with the conditions in Germany than in those here at home. Whether the proposal be to concentrate gas production at the mines, or to interconnect existing gas producing and distributing facilities, it must submit to the logical treatment of individual engineering analysis. What we must be certain of is that such problems are assigned to men enthusiastic in their desire for construction solution, and not by those inclined (even subconsciously) to regard them as unpracticable.

Also bearing directly upon the cost of gas production, and offering promise for the future, is the continued progress to be made in the direction of more rational standards of quality, which will have an economic justification and logical relation to the gas-making materials available in the different sections of the country. This will lead in the direction of lower heating value standards, tending to reduce, as England has done, the use of oil in gas manufacture with our production costs less subject to, or possibly entirely divorced from, the vagaries of that uncertain commodity.

One of our friends recently said that gas plants are today large laboratories, manned by skilled workers, and captained by professionally trained engineers and chemists. The extent to which they succeed in utilizing lower grade and cheaper raw materials in highly efficient processes with the smallest possible additions to the capital investment will also have important bearings on future production costs. It must not be thought that present carbonization processes are inefficient. The Carbonization Committee of the American Gas Association recently reported a series of tests in which various types of carbonizing plants, using the same run of coal in each test, gave results indicating that over-all thermal efficiencies as high as 80 per cent are being obtained.

Another technical committee is fostering research work on the mixing of gases.

We now come to the last of the three major possibilities tending to influence the future progress of the gas industry: The constant development of and improvement in the diversified applications of gas to industrial purposes.

There are cheaper fuels—considered simply as fuel—than gas. But there are many factors to be studied in arriving at their relative fuel values.

It has been pointed out that gas has certain inherent advantages that make it particularly suitable for use as an industrial fuel. We are not satisfied to lean

(Continued on page 114)

Huge Building Volume to Continue

According to the Seventh Annual Building Forecast of the Architectural Forum

By C. STANLEY TAYLOR

THE building records of the year just passed indicate that construction activity has continued at a pace almost equal to that of the record-breaking year, 1926. It is evident that the total annual building volume of this country during 1927 has been well over seven billion dollars.

Figures indicate that building will continue in 1928 at least in the same volume if not reaching even greater totals than 1927.

It is to be noted that those who are making casual predictions anticipating a considerable decrease in the building volume are located in large centers where there is perhaps an over-built situation which would color opinions. Probably, too, the idea of decreased activity in the building field is a natural reaction of the human mind which refuses to believe that good conditions can last so long.

Is it not reasonable to believe that there may be a basic explanation for the evident paradox of contrary opinions as to building activity? Perhaps we have not been passing through a real "boom"—perhaps the continued building activity which has been carrying on in increasing volume since 1922 is primarily based on greatly increased building requirements coupled with prosperous conditions which have provided the means.

After all, the population of this country during the past ten years has increased by many millions for which shelter of

all kinds must be provided. The tremendous volume of existing construction which has been added each year must of necessity require constantly greater building activity to take care of obsolescence and replacements. The fire losses grow greater each year in spite of efforts to curb them, but that they do not grow larger in proportion to the total number of buildings. They grow larger because the total area of risks has been tremendously increased. Naturally, replacements to meet fire losses must grow larger.

We have also to consider seriously the greatly increased standards of living. The average family requires better shelter with a greater degree of attractiveness, comfort, and utility. Similarly in business buildings of all kinds, builders must meet a demand which has grown amaz-

BUILDING TYPE	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDWEST STATES	WESTERN STATES	U.S.A.
Automotive	\$16,702,000	\$68,716,000	\$9,214,000	\$17,554,000	\$67,605,000	\$18,640,000	\$197,431,000
Banks	10,674,000	72,695,000	2,278,000	10,202,000	14,500,000	7,247,000	137,594,000
Apartment	10,457,000	347,500,000	13,842,000	22,400,000	186,400,000	72,230,000	652,829,000
Apartment Hotels	572,000	56,717,000	4,970,000	12,935,000	105,987,000	16,267,000	217,515,000
Club, Private, etc.	10,557,000	46,237,000	2,937,000	15,000,000	86,742,000	14,440,000	175,965,000
Community ^{and}	5,164,000	15,000,000	280,000	5,365,000	41,768,000	10,645,000	79,796,000
Churches	19,860,000	48,740,000	12,635,000	20,900,000	71,567,000	17,640,000	211,162,000
Dwellings	19,750,000	76,730,000	8,700,000	16,260,000	69,400,000	36,372,000	197,242,000
Dwellings (incl. apart.)	11,620,000	49,210,000	2,935,000	12,150,000	37,610,000	20,640,000	162,945,000
Dwellings (excl. apart.)	8,700,000	46,935,000	6,765,000	11,945,000	31,216,000	16,660,000	119,570,000
Hotels	21,487,000	107,272,000	19,950,000	45,175,000	195,200,000	62,917,000	565,001,000
Hospitals	22,794,000	106,210,000	9,715,000	21,320,000	110,114,000	39,300,000	306,383,000
Industrial	18,215,000	79,342,000	7,108,000	12,222,000	101,000,000	22,917,000	260,816,000
Office Buildings	26,576,000	139,674,000	9,854,000	37,473,000	263,411,000	87,720,000	586,510,000
Public Buildings	29,207,000	122,741,000	4,895,000	17,849,000	132,171,000	28,900,000	336,801,000
Schools	42,371,000	197,611,000	46,237,000	46,202,000	163,411,000	52,666,000	569,172,000
Theaters	11,792,000	56,771,000	5,152,000	8,064,000	39,763,000	26,713,000	146,221,000
Theaters (incl. clubs)	21,550,000	45,116,000	4,167,000	1,777,000	71,420,000	17,560,000	161,938,000
Welfare, etc.	10,440,000	41,414,000	4,708,000	5,731,000	38,244,000	6,545,000	106,574,000
Total Value of New Buildings	\$311,068,000	\$1,735,394,000	\$278,140,000	\$262,044,000	\$1,787,521,000	\$639,397,000	\$6,955,266,000
New Construction Under Architect's Specifications							\$4,955,266,000
<i>As shown in above tabulation</i>							
Small Dwellings Not Designed by Architects							789,540,000
Industrial Buildings Not Designed by Architects							260,816,000
Other Buildings Not Designed by Architects							499,670,000
<i>Estimated at 10% of total after deducting above two classifications</i>							
TOTAL ESTIMATED EXPENDITURE FOR NEW BUILDINGS IN 1928							\$6,505,128,000
							<i>(Not including Public Works and Utilities)</i>

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Detailed forecast of new building construction for 1928

ingly in respect to the factors of quality and efficiency.

We predict, therefore, that the building activity of the year 1928 will approximately equal that of 1927 and that over the next few years there will be no general collapse of the situation, but rather a gradual return to a new normal much higher than that established in any previous decade.

The national percentages indicated for 1928 show greater activity in the construction of automotive buildings, residential buildings of all kinds, public buildings and welfare buildings. There is evidently to be a decrease in the amount of bank building, club and fraternal buildings, community buildings, churches and office buildings. Hotels and apartment hotels are evidently to develop approximately the same volume. School building will be approximately the same, while the demand for theaters shows a slight falling off.

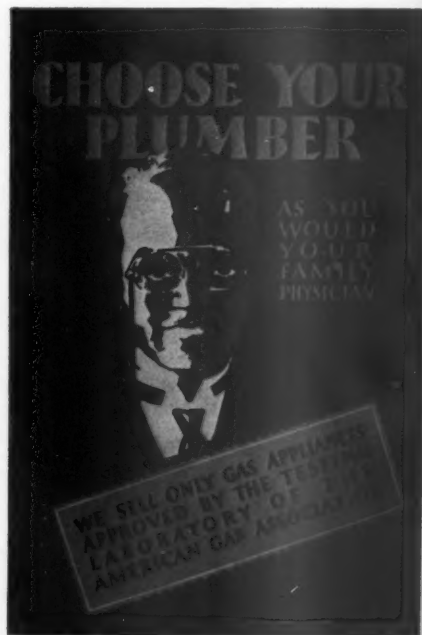
Examining comparative conditions of demand for new buildings in the different geographical sections of the country, we find the more striking changes to include a developed demand for automotive buildings in the Northeastern States with a considerable increase in the North Atlantic and Southwestern States. We find the requirements for bank buildings falling off everywhere except in the Southwestern States. The figures for apartment buildings indicate a sharp drop in requirements in the Northeastern States to almost half the total of last year. On the other hand, in the North Atlantic and in the Western States there is a slight increase in requirements. Apartment hotels show a sharp falling off in the North Atlantic States, but double the requirements of last year in the Middle States. While the demand for apartment buildings has fallen off sharply in the Northeastern States, the requirements for individual dwellings of all types have increased materially, particularly for dwellings under \$20,000.

New Heating Problems Committee Offers Services

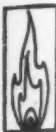
LAST year the Research Committee of the Industrial Gas Section inaugurated a service whereby manufacturers and gas companies could secure free consultation on new heating problems. Several requests were made for this service, and the information gathered was of aid to both manufacturers and industrial gas men.

This year the Committee on New Heating Problems has been assigned to this work, and through its Chairman, N. T. Sellman, will aid in furnishing information and advice on the solution of heating problems through the Research Committee of the American Gas Association as well as the entire membership of the Industrial Gas Section. The best advice and resources of the industry are available for the solution of problems. The committee will allocate the work to those having the greatest experience and are best fitted to render the necessary advice.

All communications should be sent to N. T. Sellman, chairman, Committee on New Heating Problems, American Gas Association, 420 Lexington Avenue, New York City.



The Consolidated Gas Co. of N. Y. uses this poster to promote plumber cooperation



Editorial



The New Engineer

EVERYBODY in our business now knows at least something of the Economic and Engineering Survey of the gas industry. Undertaken by the Technical Section at the request of the Executive Board and with the hearty cooperation of the other Sections of the Association, this work is progressing in orderly fashion. Possibly no more important or significant review was ever attempted within the industry and nothing more fundamental could ever have been undertaken by any other industry.

Realizing at once the fact that the ramifications of such an undertaking would be far-reaching, the Technical Section gave thorough preliminary consideration to its task and laid the ground work carefully. Under the capable leadership of Mr. Walter C. Beckjord, Mr. Harry E. Bates, Mr. F. C. Weber, and other technical authorities, supplemented by research in the Cleveland Laboratory and assisted by the Statistical Department at Headquarters, the Economic and Engineering Survey is now well on the way. Naturally, the path unfolds and lengthens as they progress.

This article is not, however, concerned primarily with the soundness and necessity of the plan nor of the direct benefits which we will gain. What interests us at the moment is the reaction which the very existence of such an activity will have upon the personnel of the industry. It is significant in marking the advent of the new engineer who interprets the message of his scientific and technical knowledge in terms of industrial and public welfare.

Our service today is the best that we can give with present knowledge and we are justly proud of many years of service to the public credited to our great industry. The Economic and Engineering

Survey was not inaugurated to bring about good service, for we have that already; nor was it undertaken to correct mistakes, for those are attended to as we go along. The purpose of the survey is to present a comprehensive picture of the industry as it is now, an analysis of its standing in the light of present day science and an appraisal of what we must do to meet its duties and responsibilities in the years to come.

Mr. Samuel Rea, retired President of the Pennsylvania Railroad, in a recent address in Philadelphia, paid splendid tribute to the gas industry, as another page in this issue records. However, Mr. Rea did more: In the paragraph printed below he explained, far better than we can, the real and vital meaning of an industry taking stock of itself:

"We are living in a scientific age and the business of the engineer is to apply the progress and discoveries of science to the affairs of every-day existence. If this is a marked characteristic of our civilization today, it will be still more marked 50 years hence, and engineering may well come into its own, with full recognition as constituting perhaps the most important of all occupations by which the human race participates in the shaping of its own destiny."

Membership

IN the January MONTHLY attention was called to the Every Member Get a Member campaign. Association Headquarters is proud to announce that many members have already fulfilled their obligation.

We wish to thank those who have secured their new member for our roll. At the same time we state that the slogan is not "Some Members Get a Member," but is "Every Member Get a Member."

ALEXANDER FORWARD,
Managing Director.

TIDE OF MEN AND AFFAIRS

J. W. Heins, of The U. G. I. Company, Dies Suddenly



J. W. Heins

WITH the New Year came a great sadness to the many friends of J. W. Heins, when they learned of his sudden death on New Year's Day. The day previous he apparently was well and happy; his death resulted from heart failure. He was 46 years of age.

"Wes" Heins, as he was affectionately known to thousands through his numerous affiliations, and who had friends wherever The U. G. I. Co. has had interests during the past quarter of a century, was best known as a U. G. I. man, having spent his entire business career in U. G. I. employ.

Thirty years ago, following the completion of grade school studies and two years at Brown Preparatory School, Philadelphia, Mr. Heins, then sixteen, got a job as office boy with the Philadelphia Gas Works. Gradually, but surely, his efforts and his personality were felt throughout the U. G. I. organization. Junior clerk, accountant (he had meantime completed the course of the School of Commerce and Finance of the University of Pennsylvania—now the Wharton School), traveling auditor of The U. G. I. Co., assistant general agent, Philadelphia Gas Works, and but recently his appointment as auditor and assistant treasurer of the Philadelphia Suburban-Counties Gas & Electric Company, briefly summarizes the progress he made.

Mr. Heins was Past Master of Melita Lodge No. 295, F. and A. M., a member of Melita Royal Arch Chapter No. 284, Mary Commandery No. 36, Knights Templar; Philadelphia Consistory No. 2 and Lulu Temple, A. A. O. N. M. S. He was a vestryman of the Protestant Episcopal Chapel of the Mediator, Philadelphia, a member of the American Gas Association, in which he served on several committees and was past-chairman of the Accounting Section. He was best known to A. G. A. members as one of the moving spirits of the Accounting Section. From the inception of the Association, he was vitally interested in the success of this Section, and served on many committees. He was also a member of the Philadelphia City Club and of the Yodh (Franklin) Chapter, Acacia Fraternity, University of Pennsylvania.

Funeral services, held on January 5, were attended by several hundred of his fellow workers and his fraternal and church associates.

Dr. I. C. White

DR. I. C. WHITE, state geologist of West Virginia since 1897, died recently in Baltimore. His death at the age of 79 ended an active career, during which he became internationally recognized as the father of the anticlinal theory of the accumulation of oil.

After finishing the common schools, Dr. White received his A.B. and A.M. degrees from the University of West Virginia in 1872, his LL.D. from the same university in 1920. He also received a Ph.D. degree from the University of Arkansas in 1880, and D.S. from the University of Pittsburgh in 1921. He was president of the Morgantown Brick Company, the Peninsular Company, The Telluric Company and the West Side Land Co.

He was assistant geologist on the second geological survey of Pennsylvania from 1875 to 1883; was associated with the United States Geological Survey from 1884 to 1888 and served as professor of geology at the University of West Virginia from 1877 to 1893.

Parr and Fielder Are Honored by Chemical Ass'n

ELECTION as president of the American Chemical Society for 1928 of Samuel Wilson Parr, professor emeritus of industrial chemistry in the University of Illinois, and internationally known for his researches in coal chemistry, is announced.

Prof. Parr, who succeeds Dr. George D. Rosengarten of Philadelphia, was chosen by mail ballot of the society's members.

Prof. Parr was graduated from the University of Illinois in 1884 with the degree of B.S. In 1885 he received the M.S. from Cornell, later studying at the University of Berlin and at the Polytechnikum in Zurich.

He has been a professor in the University of Illinois since 1891. He is a former director of the Illinois State Water Survey, and since 1905 has been consulting chemist on coal investigation in the Illinois State Geological Survey.

He devised the Parr calorimeter for determining the heat value of coal and other hydrocarbons, widely used in America and Europe; a new type of calorimeter for determining the heat value of combustible gases; a new alloy with acid resisting properties, and a new calorimeter bomb with effective platinum substitution in its construction.

A. C. Fieldner, of Pittsburgh, Pa., was elected chairman of the Division of Gas and Fuel Chemistry. S. P. Burke, of New York, was elected vice-chairman, and O. O. Malleis, of Pittsburgh, secretary-treasurer.

THE sales department of the Public Service Co. of Northern Illinois, Chicago, Ill., has been reorganized, according to an order by vice-president, John G. Learned.

Because of newly created positions and certain changes in the sales organization, six employees have been promoted: George R. Mitten, formerly industrial development engineer, has been appointed sales promotion manager. He became associated with the company in 1919 and in 1925 was appointed industrial development engineer which position he held until his recent assignment.

James F. Small has been appointed merchandise sales manager. Mr. Small was formerly manager of the Chicago Heights Gas Company, now a part of the Public Service Company. He first entered the utility business with The Peoples Gas, Light & Coke Company as a student. He was next with the Western United Gas & Electric Company as District Manager in 1913. After considerable experience as a consulting and operating engineer, he became manager of the Chicago Heights Gas Company in 1917 and held that position until 1926.

R. J. Malcomson, formerly street lighting engineer, in charge of municipal street lighting sales, has been appointed manager, lighting sales.

George C. Heisterman, formerly assistant industrial development engineer, has been appointed industrial development engineer. Mr. Heisterman became associated with the company in 1924.

E. A. Armstrong, formerly power engineer, has been appointed manager, power sales. Mr. Armstrong became associated with the company in 1920.

William F. Miller, formerly industrial gas engineer, has been appointed manager, industrial gas sales. He became associated with the company in 1921 in the capacity of industrial gas salesman. In 1926 he was appointed industrial gas engineer, which position he held until his recent assignment, which came on the sixth anniversary of his service with the company.

At the present time, the position of manager of retail sales has been left vacant by the resignation of H. B. Fisk who has accepted a position with the Federal Electric Company.

J. H. PORTER, manager of the Oskaloosa division of the Des Moines Electric Light Company, Des Moines, Ia., has resigned. Mr. Porter has been associated with the power, light, traction and gas utilities in Oskaloosa for the past fifteen years.

JOHN F. MACLANE, general attorney for the Utah Power & Light Company, Salt Lake City, Utah, was elected president of the public utilities sections of the American Bar Association at the recent convention held in Buffalo.



W. W. Freeman

This was in honor of Mr. Freeman's eight years' service as president of the Society for Electrical Development.

W. W. Freeman, vice-president of the Columbia Gas and Electric Corporation, and a member of the Executive Board of the American Gas Association, was presented with the James H. McGraw medal for co-operation at a dinner given recently at the Hotel Roosevelt in New York.

THE Society of Gas Lighting elected the following officers at its annual meeting on December 8: President, W. Cullen Morris, New York, N. Y.; vice-president, Alfred E. Forstall, New York, N. Y.; William J. Welsh, treasurer, Staten Island, N. Y.; secretary, Geo. G. Ramsdell, New York, N. Y.

J. Arnold Norcross, New Haven, Conn., was made a member of the Executive Committee.

The following Finance Committee was chosen: Chairman, Edward C. Uhlig, Oliver H. Smith, and George H. Scranton.

WALTER C. CARROLL has been elected president of the Oil Well Supply Company, Pittsburgh, Pa. He succeeds Louis Brown, who has been made chairman of the board of directors.

Mr. Carroll is a graduate of Princeton University. After two years at Harvard Law School he entered the employ of the American Sheet and Tin Plate Company, with which he was associated for 19 years, being assistant general manager of sales for 13 years. In 1921 he became associated with the Inland Steel Co., in Chicago, as vice-president in charge of sheet steel sales.

PATRICK J. HURLEY, of the Standard Gas Light Company, has been transferred to the Westchester Lighting Co., Pelham Works, Yonkers, N. Y.

HINES H. HIMSWORTH, superintendent, A and B plants, Astoria Light, Heat and Power Co., Astoria, L. I., is now with the Consolidated Gas Co., Hunts Point and East River, New York, N. Y.

J. H. MULLER, superintendent, Standard Gas Light Co., is now with the Consolidated Gas Company of New York.



E. J. Boothby

was graduated from Tufts College as chemical engineer in 1915.

He was employed as chemist for three years by the New England Manufacturing Company of North Woburn, Mass., and later served two years in the same capacity with the Atlantic Dye Stuff Company of Boston. In 1922 he joined the Fall River Gas Works Company as chemist and has successively filled position of chief chemist, assistant superintendent, and superintendent. This last position he has filled since January 15, 1925.

Burton P. Jenkins, formerly assistant superintendent, has been appointed to succeed Mr. Boothby. George E. McCaffrey, formerly chief chemist, is now assistant superintendent, and Howard A. Lockhart, chemist, has been appointed chief chemist.

ROBERT M. LEACH, of Taunton, Mass., has formally announced his candidacy for the Republican nomination for lieutenant governor of Massachusetts.

Mr. Leach was born in 1879 in Franklin, N. H. He attended the schools of that town and then prepared for college at Phillips Andover. From there he went to Dartmouth College.

In 1900 he entered the employ of the Glenwood Range Company, in the shipping department. He has remained with that company ever since, traveling as salesman, becoming sales manager and then treasurer, which office he now holds. He is president of several large furniture stores in New England, and has served as president of the National Association of Stove Manufacturers; director of the American Gas Association; director of the Bristol County Trust Company; trustee of the Taunton Savings Bank, etc.

In the World War, Mr. Leach was commissioned as Captain in the United States Army and was assigned to the Ordnance Division. He has served as Commander of Post No. 103 of the American Legion, in Taunton.

EFFECTIVE January 1, 1928, E. J. Boothby, for the past three years superintendent of works of the Fall River Gas Works Company, Fall River, Mass., was appointed manager of the Lowell Gas Light Company of Lowell, Mass. Both companies are under the executive management of Stone & Webster, Inc.

Mr. Boothby was born in Somerville, Mass. He

SEVERAL changes in personnel have been announced by the New York gas companies.

Oscar H. Fogg, vice-president of the Consolidated Gas Co. of N. Y., has been elected a director of the Central Union Gas Company.

Arthur H. Hall, who has been vice-president of the Central Union Gas Co., has been made vice-president and general manager of both the Central Union Gas Co., and the Northern Union Gas Co. Mr. Hall is a prominent A. G. A. worker. He has been chairman of the General Approval Requirements Committee since its inception. This is the committee which passes on requirements for all laboratory tests and other appliance matters.

At a special meeting of the New Amsterdam Gas Company, George W. Doane resigned as president and was succeeded by W. Greeley Hoyt, president of the Standard Gas Light Company. Mr. Doane was then made chairman of the Board of Directors of New Amsterdam Gas. George W. Parkhurst was elected vice-president and general manager of the same company.

Mr. Doane also resigned as president and a director of the East River Gas Company and Mr. Hoyt was elected to succeed him in both positions. Clifford S. Fox was elected a vice-president. Mr. Parkhurst is also vice-president and secretary of the East River Gas, the Northern Union Gas and the Central Union Gas Companies.

Mr. Doane resigned as president and a director of the Northern Union Gas Company and the Central Union Gas Company, and Frank R. Barnitz was elected president and a director of each company to succeed him.



A. D. Duff

ALAN D. DUFF, assistant treasurer of the Fall River Gas Works Company of Fall River, Mass., has been transferred to the auditing department of Stone & Webster, Inc., in Boston, according to announcement by C. C. Curtis, vice-president and manager of the Fall River Gas Works Company. This company is under the executive management of Stone & Webster, Inc.

In 1919 he joined the auditing division of Stone & Webster, Inc., and in April, 1921, he was transferred to the Fall River Gas Works Company, as chief clerk. Three and one-half years later he became assistant treasurer which position he filled until his recent appointment.

No announcement has been made concerning Mr. Duff's successor.

Affiliated Association Activities

Wisconsin Utilities Association

THE Gas Section convention of the Wisconsin Utilities Association, which is virtually the technical gas convention for that State, will meet at the Hotel Loraine, Madison, Wisconsin, on February 23 and 24. Addresses will be given by Section Chairman, Albert A. Schuetz, Milwaukee Gas Light Company; A. Gordon King, service engineer, American Gas Association; Professor O. L. Kowalke, of the University of Wisconsin; W. H. Kemen, of the Milwaukee Gas Light Company, chairman of the Committee on Gas Distribution; Wm. C. Butterworth, fuel consultant (Platteville), chairman of the Coke Committee, and Lewis Stein of the Northern States Power Company (Minneapolis), chairman of the Committee on Dehydration of Gas.

A symposium on the use of bituminous coal for water gas manufacture will be led by E. H. Cotton of the Northern States Power Company (Minneapolis), and an illustrated report on industrial gas and house heating installations will be presented by G. H. Head of the Wisconsin Gas & Electric Company (Racine).

The convention will open Thursday morning, February 23, with a regular program. Following luncheon it is planned to visit the gas plant of the Madison Gas and Electric Company and the laboratories of the University of Wisconsin to inspect laboratory facilities and equipment used in connection with research work carried on at that institution. The annual dinner of the Section will be held Thursday evening. Friday morning and afternoon will be devoted to the technical program, committee reports and the election of Section officers for the coming year.

Illinois Gas Association

THE three Illinois Utility Associations—Illinois State Electric, Illinois Electric Railways and Illinois Gas Associations—will hold their joint convention in Springfield, Illinois, on March 14th and 15th, with general sessions at the Hotel Abraham Lincoln and separate afternoon sessions—Gas at the Leland Hotel, Electric at the St. Nicholas Hotel, and Railways at the Hotel Abraham Lincoln.

Many of the leaders of the industry have accepted invitations to address the convention, among these are Oscar H. Fogg, president of the American Gas Association; R. B. Stevens, president of the American Railways Association; and Earl Whitehorn, assistant editor of *Electrical World*.

The second joint morning session program will be provided by the Illinois Committee on

Public Utility Information and the Public Speakers' Bureau.

Full details regarding the program and entertainment will be announced in the March MONTHLY.

Pennsylvania Gas Association

THE dates tentatively set by President J. A. Weiser for the annual convention of the Pennsylvania Gas Association are April 10 and 11; the place, York, Pa.

Further announcements concerning this meeting will appear in the March and April issues of the MONTHLY.

New England Gas Association

THE second annual meeting of this Association will be held in the Hotel Statler, Boston, Massachusetts, on February 15 and 16. A program has been arranged which is general in character to interest all gas men no matter what part of the industry they are connected with.

A banquet will be held on the evening of the 15th. Elaborate arrangements are being made for this event which will include entertainment and dancing. Reservations for the banquet should be made through C. S. Hilton, Pawtucket Gas Company, Pawtucket, R. I.

Ladies are invited to attend the meeting and arrangements will be provided for their entertainment.

G. Warren Stiles, of the Portland Gas Light Company, is chairman of the General Arrangements Committee and Alexander Macomber, of the Charlestown Gas and Electric Company, is chairman of the Program Committee.

It is expected that about 600 will be in attendance and it is advised that advance reservations be made direct with the Hotel Statler, Boston, Massachusetts.

Among the speakers scheduled on the program are the following: Oscar H. Fogg, president, and Alexander Forward, managing director, of the American Gas Association; Dana D. Barnum, president, and David S. Reynolds of the Boston Consolidated Gas Company; H. W. Hayward, director of research, Institute of Combustion Utilities Corporation; E. S. Dickey, president, Maryland Meter Company; C. S. Reed, rate consultant, American Gas Association.

Oklahoma Utilities Association

THE tenth annual convention of this Association will be held in the Mayo Hotel, Tulsa, March 13, 14, and 15. As usual, the program will be constructed with the idea of bringing to the rank and file of utility employees of

Oklahoma who do not attend national conventions, as much as possible of what they would get could they attend the larger meetings.

Manager E. F. McKay reports that the indications at this time are that the program, both with respect to speakers and entertainment features, will reach the high standard established by the Oklahoma Utilities Association. He further states that the attendance is expected to be a record, exceeding the registration of last year which was about 800.

As usual, manufacturers' exhibits will be a feature of the convention. As last year, the program will consist of general sessions in the mornings with division and special meetings in the afternoons. The divisions are light and power, gas, telephone, electric railway, public relations and manufacturers and suppliers. There also will be a special meeting for the women of the industry. A women's luncheon will be given at noon the second day and the usual annual banquet at night of the same day, March 14.

Details on the program will be published in the March issue of the MONTHLY.

Mid-West Gas Association

THE officers and council of the Mid-West Gas Association have decided to hold their 1928 Convention April 18-19-20 at Lincoln, Nebraska, with headquarters at the Cornhusker Hotel.

The seventh short meter course held under the auspices of this Association and Iowa State College was a success and outdid former courses, both in attendance and interest. Total registration was 149, 69 registering for the first time.

The course was divided into three sections. Section "A" was for those who wanted shop practice under the direct supervision of experts and had a registration for each section of between 30 and 35 students. Section "B" was for those who wanted to hear distribution subjects discussed and was the best attended, average attendance being 37. Section "C," for those interested in production subjects, had an average attendance of 35.

R. L. Klar, of Des Moines, was chairman of the committee on the course and he was assisted by the following:

George A. Lane Chicago, Ill.
D. C. Faber .. Iowa State College, Ames, Ia.
V. L. Hein Iowa State College, Ames, Ia.
A. T. Barrett American Meter Co., Chicago, Ill.
E. C. Falvey Sprague Meter Co., Davenport, Ia.
R. F. Galpin Muscatine, Ia.
E. L. Fischer Davenport, Ia.
O. M. Hoxie Mankato, Minn.

Pierre Plantinga, Head of Gas Machinery Co., Dies

PIERRE PLANTINGA, president of The Gas Machinery Company of Cleveland, Ohio, died of pneumonia, January 17, 1928, at Cleveland.

Mr. Plantinga was born in Bolsward, Holland, December 21, 1871, was educated on the Continent of Europe and came to the United States in 1893. After attending the World's Fair in Chicago, he became associated with the gas industry and has always remained intimately connected therewith.

He was one of the incorporators of The Gas Machinery Company in 1902, and was a member of the American Gas Association, and American Society of Mechanical Engineers.

BERNARD L. PEABLES, who for the past four years has been employed by the Haverhill Gas Light Company as chemist, has been transferred to the Blackstone Valley Gas and Electric Company of Pawtucket, R. I., for similar duties. Mr. Peables is succeeded by John Ferguson of Pawtucket.

J. F. OWENS, vice-president and general manager of the Oklahoma Gas and Electric Company, has been elected first vice-president of the Oklahoma State Chamber of Commerce. Mr. Owens is also chairman of a committee which will put on a membership campaign in an effort to raise \$200,000. This money is to be spent in advertising the resources of the state and to arouse Oklahomans to the support of their own industries.

SIGNAL honor has been conferred on Dr. W. M. Holtz, medical director of the Philadelphia Company and affiliated companies, by the faculty heads of the Carnegie Institute of Technology by his appointment as a visiting lecturer in the engineering department of the school.

GEORGE L. POLLOCK, vice-president and treasurer of the Burnside Steel Foundry Co. since its organization, has resigned to become vice-president of The Nugent Steel Castings Company, Chicago.

Prior to becoming associated with the foundry industry, Mr. Pollock had been with the purchasing department of the Burlington R. R. and later served as purchasing agent of the Wheeling & Lake Erie R. R. and the Chicago & Western Indiana R. R. and Belt Railway Company of Chicago.

A. H. CRITTENDEN has recently been appointed manager of the Mussel Shoals Gas Company of this city. He was formerly manager of the Huntsville Gas Company, Huntsville, Ala.

NATURAL GAS DEPARTMENT

N. C. McGOWEN, Chairman

S. W. MEALS, Vice-Chairman

Natural Gas Men Plan Record Convention**Annual Meeting and Exhibition Will Be Held at
Dallas, Texas, May 7 to 10**

DALLAS, Texas, is the city where the Natural Gas Department of the American Gas Association will hold its annual convention next May 7, 8, 9, and 10. Preparations for what is expected to be the largest natural gas meeting ever held in the country now are under way. The Lone Star city is making great efforts to out-do Tulsa, Okla., and Cincinnati, where the last two record-breaking conventions were held.

The convention city is in the heart of the natural gas development of the Southwest. Thousands of miles of gas mains radiate from Dallas connecting it with a dozen gas fields hundreds of miles distant. Within a few short years, the city has seen its smaller sister towns over the state evolve out of the age of wood fuel to the more dependable, cleaner, more efficient and infinitely better fuel, natural gas.

With an abundance of low priced fuel and power, the city has grown with almost unimaginable strides in the last few years.

The Texas spirit is fully awake and aroused to the importance of the big con-

**PLAN TO HAVE LARGEST EXHIBITION
ON RECORD**

THE Exhibition Committee of the Natural Gas Department, under the chairmanship of H. L. Montgomery, Bartlesville, Okla., is making plans for the largest and best exhibition ever held by the natural gas men when they meet at Dallas, May 7 to 10.

Arrangements have been completed for a particularly large and attractive exhibit hall, where there will be ample space for all exhibitors.

The exhibition will be in the Manufacturers Building, Texas Fairgrounds, Dallas. Meetings will be in the Fair Park Auditorium.

The members of the Exhibition Committee, in addition to Mr. Montgomery, are:

C. C. Cartwright, Ft. Worth, Texas; T. C. Clifford, Pittsburgh, Pa.; H. N. Greis, Tulsa, Okla.; A. W. Leonard, Tulsa, Okla.; E. F. Schmidt, Dallas, Tex., and H. L. Whitelaw, New York, N. Y.

vention and the committee on preparations is planning big things in a big way.

Fuller details will be announced in a later issue of the MONTHLY.

Dallas was founded by a hardy stock of pioneers. The blood of these adventurers still courses in the veins of the

**CALL FOR COOPERATION IS-
SUED BY COMMITTEE ON
PAPERS**

L. K. LANGDON, chairman of the Natural Gas Department Committee on Papers, has issued a call to all natural gas men to make suggestions for the program for the annual convention of the Department, to be held at Dallas, Texas, May 7 to 10.

All suggestions, both as to topics and speakers, will be welcomed by the Committee, who are especially anxious to make this first convention of the Department since the amalgamation with the A. G. A. the best, biggest, and most important natural gas meeting ever held.

Suggestions of all kinds will be welcomed, and the cooperation of all is requested by Mr. Langdon.

The Committee on Papers consists of the following:

L. K. Langdon, chairman, Cincinnati, Ohio.

John H. Maxon, Muncie, Ind.

Frank L. Chase, Dallas, Texas.

Suggestions should be sent to Mr. Langdon.

citizens that make up the more than quarter million population. In 1841 John Neely Bryan, accompanied only by his horse, pitched his camp on the banks of the Trinity River where the present wholesale implement district now stands.

It is a red-blooded city where old homes are torn down to make way for new structures, less romantic but practical. Traditions serve only to indicate that while the city has become great in a short span of half a century, it will not have served its purpose in American civilization unless it continues to grow in even greater proportions.

The name of Peter's Colony was given the village soon after its establishment, but in 1845 this name was changed to Dallas, in honor of George Mifflin Dallas, vice-president under President Polk. It was incorporated in 1871, having grown to a thriving town of 5,000.

Today Dallas ranks 19th in bank clearings, 23rd in postal receipts, 15th as a general jobbing market and only four cities surpass it in the distribution of dry goods.

At the end of the Civil War a census showed there were nearly three thousand people here. The 1927 city directory showed nearly 280,000.

It is but natural that the stranger should ask for the reason for this great increase. In the center of a vast and prosperous agricultural territory, surrounded by mineral resources of incalculable value, Dallas is the focal point of the wealth of the Southwest. Strategically located for supplying the needs of the empire of the Southwest, Dallas has built a mercantile and financial center which today ranks high among the major commercial cities of this country.

Agriculture was largely responsible for the early development of the city. Wholesaling and jobbing then entered the field and has grown to such an extent that this year the retail merchants of the Southwest will buy approximately one billion dollars worth of merchandise here.

Now a third factor is adding to Dallas' strength as the "center of the Southwest." That is manufacturing. Eight hundred factories are turning out \$163,000,000 worth of manufactured goods each year. New factories and factory branches are being announced almost daily.

Perhaps no form of individual sport has been so enthusiastically supported here as golf. There are sixteen golf courses, five of which are municipal. The temperate climate makes golf a year-round pastime. The attractive courses have brought some of the world's most famous golfers to Dallas.

Dallas hotels have grown in magnificence and in hospitality with the city. Thirty million dollars are invested in the 130 hotels here. Twenty thousand visitors can be comfortably housed each night. Some of the largest conventions have been handled with ease.

A. P. I. Reports on Gas Conservation

Report of Technical Sub-Committee of the Committee on Gas Conservation—Introduction and Conclusions

Attached to this report of the American Petroleum Institute is a complete history of the committee's activities. It also contains a minority report filed by Henry McGraw, and a suggested oil and gas mining lease form.

The Board of Directors of the A. P. I. accepted the report and continued the committee. It also passed a resolution in favor of the enactment of laws to prevent the waste of gas by oil producing states in which natural gas is being wasted unnecessarily.

THIS report is a summary of the voluminous data submitted, in detailed reports, in committee discussions, and in a three-day hearing at Ponca City, by more than one hundred production engineers, geologists, chemists, and physicists regarding the importance of natural gas in oil production and the means for utilizing it most efficiently. These men come from all the important fields of the United States, and represent three Federal agencies, nine universities, the National Research Council, thirty-four oil companies, and a number of individual activities.

The data show conclusively that the conservation and efficient utilization of gas are of paramount importance in the conservation and economical production of oil. Gas dissolved in oil makes the oil more fluid, and more capable of movement through the pore spaces of the reservoir rock to the well: the energy stored in the same gas is the chief force behind that movement. The more gas the easier the oil moves and the greater the force available to move it. To dissipate gas from an oil sand is to lessen the propulsive force and increase the need for it. The energy and solution values of oil-field gas are of tremendous importance. The proper utilization of gas results in greater and more orderly oil recovery at lower cost.

The data show that the way to use gas to the best advantage is to use it in its

original state, and, that the conditions in a sand, once destroyed, can never be completely restored; but they show also that the injection of gases into many fields has had highly beneficial effects.

The data show that many methods are of value in conserving gas and utilizing it efficiently, that the effectiveness of each method varies in different fields and with different wells, and that no single method or group of methods can be universally applied. Each well should be studied as an individual problem and to it should be applied the combination of methods found to give the best results.

The data show finally that many, probably most, of the best methods for gas utilization can be practiced advantageously only when they can be applied systematically to a whole field; that competitive drilling in individual fields almost inevitably leads to gas waste and lessened ultimate oil production; and that either complete cooperation or unit operation is the ideal operating condition for the conservation of both gas and oil.

OCCURRENCE OF OIL AND GAS

Oil and gas originate from various organic materials deposited in sediments and converted into oil and gas by heat and pressure during geologic processes. Differences in the character of the organic material, differences in the amount and duration of the heat and pressure, and differences in the chemical environment result in hydrocarbons ranging from the lightest gas to the heaviest asphalt.

These oils and gases are found concentrated on rock-folds known as geologic structures, in reservoir rocks of greater or less porosity, thickness, and homogeneity. The reservoir rock may be, for example, a single sandstone bed a few feet

thick and of uniform porosity, a porous lense in a limestone, or a great body of poorly consolidated sediments made up of relatively thin and often lenticular beds of pervious sand and impervious shale. The great variety of reservoir rocks gives an equal variety of production conditions. The reservoir pressure in the homogeneous sandstone is likely to be the same throughout the field; in the limestone bed variations in porosity may induce variations in the pressure; in the alternating sediments the reservoir pressure, the character of the hydrocarbons, and the water conditions may be different in each sandstone layer and in every part of the field. Whatever the character of the reservoir it is commonly referred to as a "sand."

Some productive sands contain oil and gas; some contain gas alone; oil sands without gas are practically unknown. This summary is concerned only with reservoir rocks carrying oil and greater or less amounts of gas.

Gas may be present in an oil sand in one or all of four phases; (a) free; (b) dissolved in the oil; (c) as a liquid, becoming a gas when the pressure is lowered; and (d) adhering to the surfaces or interfaces between the gases and the liquids, the fluids and the solids in a process known as absorption. Each of these phases has its bearing on the efficient utilization of the gas.

THE IMPORTANCE OF GAS IN OIL PRODUCTION

Natural gas in most oil sands is the most important agent in the recovery of oil. In some fields water is the all important expulsive force and in some gravity assists in production, but in most fields water and gravity are of minor importance when compared to the work of gas.

The gas may, and as far as possible should, be utilized as "original gas" before being exhausted from the sand, but when the original gas has been wholly or partly dissipated, gas may advantageously be injected.

VALUE OF ORIGINAL GAS

Gas in an oil sand should be looked on primarily as a source of energy rather than as a substance. This stored energy is the prime motive force for the extraction of the oil from the reservoir. It drives the oil through the minute pore spaces of the reservoir rock to the well and lifts or helps to lift it to the surface.

Gas has a second and almost equally important value—its value in increasing the fluidity of the oil. As already noted, part of the gas in an oil sand may be in liquid form; part may be dissolved in the oil. The amount that may be dissolved depends upon the character of the oil and the character of the gas, and is proportional to the temperature and the pressure.

The greater the amount of dissolved and liquid gas in an oil the lighter the oil, the less viscous, and the lower its surface tension. Specific gravity, and surface tension of the oil are all lessened by the solution of the gas, and as these are lessened the mobility of the oil is increased. Rendered more fluid by the gas, the oil can pass through the intricate, tortuous interstices of the reservoir and find its way to the area of lower pressure at the well. Greater fluidity, greater mobility, greater ease of movement—these represent the solution value of gas in oil.

It will be noted how these two values supplement one another. The gas makes the oil easier to move; the energy in the gas moves it. These two properties of gas are of prime importance in the production of oil.

When a well penetrates a petroleum reservoir theretofore untouched, gas pressure is released about the well and oil and gas begin to flow through the reservoir spaces toward the point of lowered pressure. As the fluid moves toward the well there is a progressive drop in pressure. With the drop in pressure the free gas expands and drives the oil through the sand; the dissolved gas comes out of solution and becomes free gas; the liquified gas vaporizes and becomes free gas,

and the additional gas also helps to drive the oil to the well. The progressive liberation of energy increases the velocity of the fluids and overcomes friction as they move through the rock voids toward the point of egress.

It is logical to assume that those winding pore channels which have the greater and more uniform cross section will carry a more mobile fluid, a fluid with a greater proportion of gas, than the other channels, and that this gas proportion is augmented by distillation from neighboring channels. The natural gas in endeavoring to escape from the reservoir in such a way as to reduce the stored energy attempts to clear those larger and more uniform pore channels of petroleum, which, when cleared, will permit the free egress of the remaining gas to and out of the well, leaving a maximum of petroleum in the reservoir. If the pressure is too rapidly reduced by permitting too rapid escape of gas from the well, the proportion of oil left in the reservoir is increased.

As the pressure is lowered and the dissolved and liquid gas leaves the oil, the oil becomes more viscous and increasingly difficult to move and this augments the tendency to leave more oil in the reservoir if the pressure is too rapidly exhausted.

As the production declines the proportion of gas produced with the oil—the gas-oil ratio—increases, and the gas energy declines below the point necessary to flow the well. Thus the flush or flowing period of the field passes.

As the field declines pressures are lower than during the flush period and oil is not so plentiful or so mobile. Gradually oil accumulates in the bottom of the well and the surrounding sand and obstructs the passage of the gas. Pressure is built up behind the oil and when this pressure is great enough the well again flows, the sand near the well is again depleted, and the cycle is repeated. This is the period of intermittent flow.

Finally the amount of oil reaching the well and the amount of gas and gas pres-

sure behind it are not great enough to cause even intermittent flow. Gravity begins to play a more important part in the movement of the oil, especially if the reservoir body be thick. The oil is less mobile, all the gas energy is utilized in bringing the oil to the well, and artificial means must be employed for lifting it. The well has reached the pumping stage.

It is readily seen that throughout the well history, the gas present in the oil has facilitated movement toward the well, and that, except for the part that may have been played by other forces such as water and gravity, movement has depended entirely on the gas energy.

In many fields the gas pressure has played a third important role in holding back edge or bottom water or both and preventing its encroachment into the productive parts of the sand. When the gas pressure declines below the hydrostatic head of the water friction alone delays the water in flooding the field.

INJECTED GASES

At almost any stage of the field's depletion gas (either natural gas or some other) may be injected into the sand in an attempt partially to restore original conditions and thus increase both the immediate and the ultimate oil production. It is possible by such injection of gas to restore in part the earlier gas pressures and thus rebuild the energy value stored in the field. There is grave doubt whether the solution value of the gas can be restored.

It seems unlikely that injection of gas restores anything approximating the original conditions. The introduced gas is nearly always lacking in fractions which will liquify at the restored pressures. The area of contact between the gas and oil is relatively small and diffusion of the gas through the oil is apparently slow. Gas is probably not re-adsorbed at the liquid-solid interfaces. Thus three of the four original phases of the gas are seemingly not recreated; the energy effect of free gas is restored, but the energy effect

of the adsorbed gas and the energy and solution effects of the liquid and dissolved gases are not fully restored. Despite these facts, however, the injection of gases is one of the best methods for rejuvenating many fields. The energy effect of the free gas is alone an important asset.

As to the relative values of various gases, the injection of natural gas, preferably of the same composition as that taken from the reservoir, would go farthest toward restoring original conditions of energy and solution. The introduction of identical gas is difficult, however, because the compression of the gas for injection denudes it of some of those constituents which would otherwise liquefy in the reservoir and increase the mobility of the oil.

There is some evidence that the driving effect of air is at least as great as that of gas. Air oxidizes some oils and makes them more viscous, and hence more difficult to move through the pores. Under certain conditions the air forms explosive mixtures unsafe for fuel purposes, and in many fields, especially those in which sulphur is present, it increases corrosion of the casing and tubing.

Flue gas resulting from the combustion of natural gas may be treated and used for injection purposes. It is free from most of the corrosion and explosive disadvantages of air, but its effect on the viscosity is about the same.

As already said, the injection of gases into depleted sands is in many fields an effective method of increasing production, but it cannot compare in effectiveness with the efficient utilization of the original gas.

THE EFFICIENT UTILIZATION OF GAS IN OIL PRODUCTION

The purpose of the efficient utilization of gas in oil production is to produce the most oil at the least cost in the most orderly manner. The most efficient method is the one making the greatest effective use of the energy and solution values of

the gas. It is the method that will produce the greatest amount of oil with the minimum expenditure of gas energy. The cubic feet of gas produced with each barrel of oil, known as the gas-oil ratio, is a working index, but not an infallible index of the efficiency of any method; in general the lower the ratio the greater the efficiency.

No one method can be prescribed; the method most effective with one well may fail with another. The variations in thickness and porosity of reservoir sands, in character of gas and oil, in hydrostatic head, in gas pressure, and many other factors necessitate the study of each field and even of each individual well. This is the province of the production engineer. The methods herein briefly discussed are those that have given favorable results in various places and under various conditions.

METHODS DURING DEVELOPMENT

Careful study should be given to the spacing of wells. Too wide spacing gives the gas too great a distance to propel the oil, and results in inadequate drainage and lower recovery of oil per acre. It is obvious, of course, that too close spacing gives an excessive development cost per acre.

The timing of wells should also be given consideration. The ideal method of utilizing gas energy to the fullest extent would be to drill all the wells necessary to drain a structure, cap each well brought in until the boundaries of the field are determined, and then put all wells on production at the same time. This is possible, of course, only when an entire structure is handled under a single development and production program.

Careful thought should also be given other drilling problems, such as the depth to which the reservoir should be penetrated; the complete cleaning of mud from the face of the sand; the placing of shots so as to avoid the shattering of impervious beds above or below the res-

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ACCOUNTING SECTION

EDWARD PORTER, Chairman

F. H. PATTERSON, Vice-Chairman

H. W. HARTMAN, Secretary

A Bibliography of Books On Public Service Economics

By LUIS HILT

Librarian, American Gas Association

THE following is a list of some recent books on public utility economics, finance and regulation, applicable to studies of these problems in the gas industry.

No attempt is made in this compilation to include the many excellent articles relating to these subjects; a rather complete Bibliography was prepared by 1923 Rate Structure Committee and brought up to date by the 1926 and 1927 committees respectively. The Reports of the rate committees of the Association will be found, together with the bibliographies in the annual Proceedings.

ECONOMICS

- "Problems in Public Utility Management"—Cabot & Malott—A. W. Shaw Co.—1927.
- "Fundamental Thoughts in Economics"—Cassel, G.—T. F. Unwin, Ltd., London—1925.
- "Economic Statistics"—Crum & Patton—A. W. Shaw Co.—1925.
- "Outlines of Economics"—Ely, R. T.—The Macmillan Co.—1920.
- "Outlines of Public Utility Economics"—Glaser, Martin G.—The Macmillan Co.—1927.
- "Depreciation"—Kester, Roy B.—The Ronald Press Co.—1924.
- "Principles of Economics"—Marshall, A.—The Macmillan Co.—1922.
- "Budgetary Control"—McKinsey, J. O.—The Ronald Press Co.—1922.
- "Business Cycles"—Mitchell, W. C.—National Bureau Economic Research, Inc.—1927.
- "The Economics of Public Utilities"—Nash, L. R.—McGraw Hill Book Co., Inc.—1925.
- "The Taxation of Public Service Corporations"—Simpson, H. D.—1927.
- "Business Cycles and Business Measurements"—Snyder, Carl—The Macmillan Co.—1927.
- "Principles of Economics"—Taussig, F. W.—The Macmillan Co.—1921.
- "Principles of Economics"—Taylor, F. M.—The Ronald Press Co.
- "Public Service Corporations" (2 vol.)—Wyman, Bruce—1921.

FINANCE

- "Financial and Operating Ratios in Management"—Bliss, J. H.—The Ronald Press Co.—1923.
- "The Financial Policy of Corporations"—Dewing, A. S.—The Ronald Press Co.—1926.
- "The Financing of Public Service Corporations"—Ignatious, M. B.—The Ronald Press Co.—1922.
- "Public Utility Finance"—Lagerquist, W. E.—A. W. Shaw Co.—1927.
- "Applied Business Finance"—Lincoln, E. E.—A. W. Shaw Co.—1923.
- "Financial Handbook"—Montgomery, R. H.—The Ronald Press Co.—1925.

REGULATION

- "Effective Regulation of Public Utilities"—Bauer, John—The Macmillan Co.—1925.
- "Cases on Public Utilities" (2 vol.)—Beale & Wyman—1920.
- "Public Utility Regulation"—Cooke, M. L.—The Ronald Press Co.—1924.
- "Theory and Practice of Public Utility Valuation"—Maltbie, W. H.—McGraw Hill Book Co., Inc.—1924.
- "Regulation and the Management of Public Utilities"—Morgan, C. S.—Houghton, Mifflin Co.—1923.
- "Public Utilities"—Pond, O. L.—The Bobbs-Merrill Co.—1926.
- "Depreciation of Public Utility Properties"—Riggs, H. E.—McGraw Hill Book Co., Inc.—1923.
- "Cases and Authorities on Public Utilities"—Robinson, G. H.—1926.
- "Cases on Public Utilities"—Smith & Dowling—1926.
- "Guiding Principles of Public Service Regulation" (3 vols.)—Spurr, H. C.—Public Utilities Reports, Inc.—1926.
- "Some Legal Phases of Corporate Financing, Reorganization and Regulation"—Stetson, F. L.
- "Public Utilities and the Law"—Wherry, W. M.—The Writers Publishing Co., Inc.—1925.
- Annual Reports of State Public Utility Commissions.
- Public Utility Reports—Annotated—1915 to date.

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too heavily upon these bounties. They are likely to be somewhat less important as time goes by, for it is only to be expected that there will be constant improvement in the efficiency with which other fuels are used. It becomes necessary for us, therefore, to assure ourselves of constant improvement in the efficiency with which gas fuel also is used. Most of the principles of combustion, and many of the principles of utilization, have been satisfactorily met, and our future work will lie largely in the application of these principles to the benefit of the industrial user as reflected in the quality and cost of the finished manufactured product. With this aim in view, fundamental research in the effect of heat upon the product to be treated is being extended into new and promising fields.

The ability, with gas fuel, to control temperature exactly by automatic means, and to remove this task from the hands of the operator, has not only stopped a serious loophole of waste, but has opened up new avenues of development.

A year or so ago, the *Monthly Review* of the United States Department of Labor said:

"We are at the present time experiencing the most remarkable advance in productive efficiency in the history of the modern industrial system."

Our future development in the use of gas for industrial operations must be attuned to the most exacting requirements of this "productive efficiency." To accomplish this, we must study thoroughly, and in every instance accurately determine the most efficient application of gas to the particular heating process under consideration. It is to that end that our industrial research work should be directed, and is now so organized, as shown by the following statement of the Industrial Research Committee of the American Gas Association.

"To produce equipment that will be of value to the gas industry, it is necessary to consider and embody the best technique of the industry that will use the product; utilize the best gas utilization technique in order to se-

cure the greatest value from our fuel, and embody the practical shop requirements of a working machine.

"To coordinate the technical requirements of industry with the combustion technique, as well as the practical embodiment in a machine, requires the coordination of three agencies with three different viewpoints: The combustion engineer, the industrial research chemist or physicist, and the production shop."

In this brief declaration is expressed the industrial research policy of the Association, which is carrying out a systematic, thorough and orderly program, utilizing, in addition to its own laboratory facilities and personnel, the laboratories and technical staffs of a number of our larger gas companies. This is supplemented by work allocated to research fellowships in several leading universities and scientific institutions, all of it being harmonized with the development work of industrial gas equipment manufacturers and perfected in direct cooperation with the industries themselves through practical experiments conducted in various manufacturing plants.

This far-sighted activity, although of recent origin, is already yielding the most gratifying results. Modern principles of design have been used in practically every case when applying gas as fuel.

In what I realize must seem a superficial way, I have endeavored to present some idea of what we believe will be our part in the development of American industry, drawing not so much upon the reservoirs of prophetic fancy as upon the aims that seem reasonable of accomplishment in the years immediately ahead. Our future will be shaped largely by those whom we speak of at the moment as the younger men—those of scientific and technical training who are coming into our industry in constantly increasing numbers. Though I say we have need of them, I do not imply the slightest reflection upon those who have guided the progress of our business in the past. It is simply that the application of the best scientific principles is more than ever

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PUBLICITY AND ADVERTISING SECTION

E. FRANK GARDINER, Chairman

JAMES M. BENNETT, Vice-Chairman

CHARLES W. PERSON, Secretary

Telling the Utility Story to Students

120,000 High School Seniors in Pennsylvania Learn What's What About Public Utility Companies

By A. G. MACKENZIE

Director, Pennsylvania Public Service Information Committee, Philadelphia, Pa.

FOR the past decade the public utility industry has been continually increasing its emphasis on the necessity of letting the general public know all about its financial and operating methods.

"Public relations" has developed into one of the most essential activities of the modern utility company and its importance can be better realized when one considers that the general public forms the great bulk of the buying power that absorbs the utility securities.

It is, therefore, absolutely vital to the financial welfare of the utilities that investors be kept fully informed of just what becomes of the money they have invested and how it is distributed in the maintenance and development of the utilities' operations.

In order that accurate information on the history, development, and operating methods of public utilities may be available, the Pennsylvania Public Service Information Committee, 1410 Widener Building, Philadelphia, has issued sets of



PUBLIC utility companies are to be congratulated on the rapid advancement of their work with schools and school pupils. Started several years ago by the Illinois Committee on Public Utility Information, this work has grown to national proportions.

The Pennsylvania Public Service Information Committee has had phenomenal success with the four pamphlets prepared for distribution in Pennsylvania schools. Mr. MacKenzie's statement that schools in 64 out of 67 counties were reached indicates the willingness of the schools to receive accurate utility information.—Editor.

four booklets bearing on the gas, electric, telephone, and street railway branches of the utility industry.

These booklets set forth the discovery of natural gas, the processes of manufacturing gas, and delivering it to the customer, the history of its development and its application to present-day heating problems; they treat of the generation and distribution of electric power and its application to the home, farm, and factory by means

of interconnected systems; they deal with the development of methods of communication and they set forth the origin and development of our modern systems of transportation.

The schools of Pennsylvania evinced a deep interest in the booklets and requests for copies poured into the committee from school superintendents all over the state so that a second printing was necessary to meet the demand.

At the present time a total of 120,000 booklets has been distributed to the senior classes in high schools in 64 out of the 67 counties in the State of Pennsylvania.

MANUFACTURERS SECTION

H. LEIGH WHITELAW, Chairman

J. A. FRY, Vice-Chairman

C. W. BERGHORN, Secretary

A Note on the Mechanism of Condensation of Water Vapor in Flue Pipes

By C. G. SEGELER

Industrial Editor, American Gas Association

PERIODICALLY the problem of condensation of corrosive liquids from the ordinary flue products of gas-fired equipment comes before the eye of the industrial and house heating departments of the gas company. It may, therefore, be interesting to consider the exact mechanism by which this condensation occurs, what makes the liquid corrosive, what steps may be taken, either to prevent the condensation or to use materials which it will not effect. The last named is the method principally in use at the present time. The specifications for chimney construction usually include mention of a tile lining, which, when properly set in place using cement mortar, will prove impervious and resistant to condensate water.

The connection from the appliance to this chimney flue has been the subject of considerable study and almost every conceivable material has been tried. The cheapest flue pipe material has been plain black sheet iron, although galvanized metal is often used. Obviously the zinc coating of galvanized iron is readily soluble in dilute acids (sulphurous and carbonic acids are the two obvious constituents of acid water of condensate, however, traces of sulphuric acid may be presented as well), the life of such a flue pipe depending on the amount of condensation which forms. Long horizontal runs are never desirable and for short runs it is usual to pitch the flue product down towards the appliance. The joints should be sloped so that condensate will not run into the joint but away from it.

Copper and monel metal have been used with a marked degree of success

but these materials, particularly the latter, are comparatively expensive. The life of monel metal under present indications seems very long and the material has been highly recommended. Sheet lead is obviously very resistant but difficult to handle and very hard to support properly. This note was not intended to be a catalogue of the various materials nor of the success with which they have been utilized to prevent condensation, but rather to explain how this condensation takes place.

It has often been assumed that water vapor condenses at 212° but under the conditions in which it is present in the flue products it never begins to condense at this temperature. In fact, of the gases investigated there seems to be none in which condensation will start above 145° F. Let us take for example retort coal gas of average composition. Under theoretically perfect combustion, each cu.ft. of gas burned would produce 1.2 cu.ft. of water vapor, both measured under the same conditions 60° F. and 30 in. pressure theoretical volume only because water vapor cannot exist at 60° and 30 in. pressure (it would all be liquid under those conditions); the total volume of flue products produced on burning one cu.ft. of gas would be 5.7 cu.ft. According to the well-known Dalton's Law the total pressure is the sum of the pressure of the separate constituents and the pressures which these exert are proportional to their concentration. Water vapor in the flue products is present in a concentration of $\frac{1.2}{5.7}$ parts. It thus exerts a par-

tial pressure of .21 atmospheres. This is equal to 3.1 lbs per sq.in. In order for water to condense the flue products must be saturated. From the steam tables it will be found that the saturation temperature corresponding to a partial pressure of 3.1 lbs. per sq.in. is 143° F. It follows, therefore, that not a drop of water can condense until the local temperature around the flue pipe is down at least to that temperature. Furthermore, as the gases cool there is less and less water left behind. When the temperature has reached 117°, the partial pressure is about half as great and about half of the water vapor has condensed.

These remarks can also be stated in another way by calling attention to the fact that the dew point must be reached before condensation commences. Of course, this dew point is exactly the same temperature as the saturation temperature which we have just mentioned. This points the way to a method whereby condensation could be stopped and this method is in use in part at all times. The back-draft diverter admits air as well as drawing the flue products into the flue pipe. This air increases the volume of the products and, therefore, decreases the partial pressure of the water vapor and consequently lowers the temperature at which condensation begins. It is possible by adding additional air through the back-draft diverter to reduce the temperature at which condensation begins to any value desired. Of course, the addition of this excess air lowers the flue temperature and decreases the draft available.

The water vapor forms more readily from appliances whose flue products leave at a low temperature, but this does not seem to be a justifiable reason for designing the appliances either to be over-ventilated or to have a high flue temperature. It would seem better perhaps to redesign the back-draft diverter so that it could be made to inspire a larger quantity of excess air at that point.

CONDENSATION TEMPERATURES FOR VARIOUS GASES

Gas	Perfect Combustion F	10% Ex-cess Air F	50% Ex-cess Air F
Natural Gas	138°	133°	124°
(Texarkana)			
Natural Gas	137°	131°	122°
(Cleveland)			
Retort Coal Gas	143°	138°	126°
Coke Oven Gas	142°	138°	125°
Carburetted Water			
Gas	129°	126°	115°
Oil Gas	144°	138°	128°

What the Well-Dressed Boiler Will Wear

CLOSE-fitting jackets are all the style. They may be of a variety of colors, but to be the best taste, they should be subdued and harmonious. Gaudy or bizarre effects are taboo in the best circles.

Much attention is given to the jacket linings which must be durable and warm.

One cannot be too careful about trimmings these days. The very best quality and most up-to-date style is demanded in these details of the ensemble.

Hoods are still worn and must be carefully designed. Cleveland sets the fashion in these matters.

Hartford connections are very popular.

Blue Stars will be conspicuously displayed. This is something of a novelty, but is already sanctioned in the most exclusive circles.

Nominal ratings are strictly passe.

Tubular effects will continue the rule in certain sections.

Since the advent of prohibition, convention demands strict adherence to the water line, and no well-bred boiler ever loses its control.

Gas lines will be full and flowing except during periods of low water when they must be cut off.

In valves, something snappy is preferred by the most fastidious.

Efficiencies are worn as high as possible.

The best informed predict a large attendance and much interest at the next style show which will be at Atlantic City in October.

Our correspondent who visited the recent show in Chicago reports that he made a B-line for the Stevens and found satisfaction universal.

The crowds agreed that this is the gas era, and he heard comments of Ideal and Peerless. He found steel Kenes widely carried and declares there is another Richmond in the field. One of the booths reported much popularity and no toil.

He went on to Minneapolis and found honey well liked there.

He states that Niagara is now nationally known and that while Chicago has a large foreign element, he believes that Kewanee is strictly American.

INDUSTRIAL GAS SECTION

F. C. MACKEY, Chairman

J. P. LEINROTH, Vice-Chairman

C. W. BERGHORN, Secretary

Industrial Men Plan for Biggest Year**Section Activities Are Well Under Way; Important Work Scheduled for the Association Year**

A MOST significant and comprehensive program is being undertaken by the Industrial Gas Section under the chairmanship of F. C. Mackey, of the Public Service Company of Northern Illinois, Chicago, Ill. Competent committee personnel is tackling the problems facing the industrial gas men, and there is every indication that this Section, as well as the other Sections, will carry their full share of the burden in bringing the industry's Three- to Five-Year Program to a successful completion.

A study of the committee appointments of the Section reveals adequate representation from natural gas territories. It is felt by leaders of the industry that both the manufactured and natural gas men interested in industrial utilization will benefit from an exchange of experiences. The natural gas representatives will bring with them possibly an even more extensive experience in the wholesale use of gas than the men in manufactured gas territories.

An activity of this Section which has been carried on successfully for the past three years is the trade paper advertising campaign. John F. Weedon, of Chicago, is chairman of the committee charged with the execution of the campaign. At the present time national copy is appearing in trade magazines and six college papers. Local companies are also tying in with the program by running mats of the national copy in their daily newspapers.

W. F. Miller, of Chicago, is chairman of the Competitive Fuels Committee. Detailed announcement of the scope and duties of this committee will appear in an early issue of the MONTHLY.

The Industrial Gas Section has long

sponsored active education of personnel engaged in selling industrial gas and has encouraged cooperation with educational institutions and societies. This year courses on salesmanship will be sponsored at different localities. The committee also cooperates actively with the technical industrial gas courses offered at various universities.

J. P. Leinroth, of Newark, N. J., is chairman of this committee on Education of Personnel and Contact with Educational Institutions.

An activity which has proved itself of great value in the past, and which will be continued because of the cumulative effect of the results, is participation by the American Gas Association in the annual exhibition of the Society for Steel Treating. As mentioned on another page in this issue, the Executive Board has approved participation at the 1928 show in Philadelphia, and the Section's Committee on Display and Contact with National Industrial Organizations will be in charge. D. W. Chapman, of Chicago, is chairman.

J. F. Quinn, of Brooklyn, N. Y., chairman of the committee on Progress and Contact with Furnace Manufacturers, reports that his committee will keep in close touch with all furnace developments in the country. The United States has been divided into ten districts, and sub-chairmen appointed for each district, with one sub-chairman for Canada. Data and photographs of installations will be collected.

The sub-chairmen appointed are as follows:

District 1: H. J. Ayling, New Haven, Conn.

District 2: C. E. Muehlberg, New York, N. Y.

District 3: L. E. Biemiller, Baltimore, Md.

District 4: W. A. Hudson, Birmingham, Ala.

District 5: H. F. Rehfeldt, Chicago, Ill.

District 6: F. C. Hoffman, St. Paul, Minn.

District 7: F. M. Rosenkrans, Kansas City, Mo.

District 8: C. W. Gale, Denver, Colo.

District 9: J. H. Gumz, San Francisco, Calif.

District 10: L. C. Hafner, Portland, Ore.

District 11: H. E. G. Watson, Toronto, Can.

As a result of past activity this committee now has available complete and exhaustive data on some 170 installations.

The Publicity Committee, under the chairmanship of Harold O. Andrew, New York, N. Y., will continue its efforts to have articles published in trade and business magazines. This committee has been especially successful in the past, and indications point to an even better year ahead.

The Industrial Rates Committee, E. L. Wilder, chairman, proposes during the coming year to select operations which are outstanding and gather specific data concerning their operation. This work will be handled by forming sub-committees of one, two or three men who will concentrate upon the securing of information concerning one particular process. The subjects which it is proposed to investigate are as follows: Forging, soft metal melting, large volume baking, ceramics, enameling, varnish cooking.

It is also proposed to present for the use of industrial men a sample application of cost analysis to show the determination of an industrial rate. This work will be undertaken by E. J. Devlin, vice-chairman of the Committee, and will be handled in cooperation with the Rate Structure Committee.

The Committee on New Heating Problems, N. T. Sellman, New York, N. Y., chairman, will advise gas companies and industrial plants, by correspondence and notices in trade journals, that their services are available for the solution of problems pertaining to the application of heat, and will allocate the study of such problems to appropriate agencies.

The Hotel and Restaurant Sales Promotion Committee is undertaking an important work under C. H. French, chairman. The committee's activities will be directed toward recommending ways and means, sales policies and procedures for securing this class of business, for holding it and for increasing it, and study will be made of value of this business to the gas company.

An undertaking of special merit is the decision of the Sales Methods Committee, with E. C. Weston as chairman, to prepare an industrial gas sales manual. The following are proposed subjects to be covered:

1. The type of man to be employed by the industrial department.
2. Sales which should be included in the industrial department.
3. An outline showing how contact is made with the prospect.
4. How often follow-up calls should be made.
5. Recommendations on conversion work.
6. How prospects are assisted in solving their manufacturing problems.
7. A set-up in reference to the sale of industrial appliances.
8. How the furnace manufacturers should be lined up.
9. The submitting of a proposal to the prospective customer.
10. An outline of salesman's reports.
11. Trial installations.
12. The giving of service to customers.
13. Budget and what it means to an industrial department.
14. The method of training men for the industrial department.

(Continued on page 122)

COMMERCIAL SECTION

J. J. BURNS, Chairman

J. W. WEST, Jr., Secretary

G. M. KARSHNER, Vice-Chairman

Mid-West Conference to Be Held in February

Chicago Will Be Scene of Second Annual Sales Meeting

On February 15, 16 and 17

THE second annual Mid-West Regional Sales Conference will be held at the Hotel Sherman, Chicago, Ill., February 15, 16, and 17, under the auspices of the Commercial Section of the American Gas Association.

The sales conference idea needs no introduction to the gas men in the Mid West and contiguous sections. The papers and discussions of the first conference held last February were of such high quality and uniform practical value that all of the 450 who attended were enthusiastic over the success of the meetings.

Preliminary announcement of the program for the second conference predicts an even better conference for this year. All papers will be confined to the sale of gas for domestic purposes, and the speakers have been selected for outstanding accomplishments in the merchandising of the appliances they will cover. Of real benefit will be the discussions, for which ample time has been allowed.

The time—chosen to allow those who attend opportunity to put the information they gain in use this year—the place—as central as possible—the program—the speakers, and the discussions all point to one of the most successful sales conferences.

The program is as follows:

FEBRUARY 15—A.M.

Address—J. G. Learned, vice-president, Public Service Co. of Northern Ill., Chicago, Ill.
Welcome from A. G. A.—Alexander Forward, managing director.

Selling Gas Refrigeration during 1927—E. S. Murray, The Laclede Gas Light Co., St. Louis, Mo.

FEBRUARY 15—P.M.

Marketing Storage Water Heaters—Howard Pett, Consumers Power Co., Jackson, Mich.

FEBRUARY 16—A.M.

Central House Heating—H. B. Johns, The Peoples Gas Light and Coke Co., Chicago, Ill.
Incineration by Gas—Frank Sheridan, North Shore Gas Co., Winnetka, Ill.

FEBRUARY 16—P.M.

Symposium on Auxiliary Heating

Radiant Type Heaters—A. W. Baker, Kansas City Gas Co., Kansas City, Mo.

Displacing Solid Fuel from Stoves and Ranges—C. A. Luther, The Peoples Gas Light and Coke Co., Chicago, Ill.

Garage Heaters—L. J. Boulogny, Western United Gas and Electric Co., La Grange, Ill.

Gas-Fired Steam Radiators—B. P. Gulley, Illinois Power and Light Corp., East St. Louis, Ill.

Symposium on Sales Aids

Campaigning Ranges—C. A. Nash, United Light and Power Engineering and Construction Co., Davenport, Ia.

Home Service—Gladys Peckham, Michigan Federated Utilities Co., Plymouth, Mich.

Window and Store Displays—R. M. Martin, Consolidated Gas Co. of New York, N. Y.

Advertising for Greater Merchandise Sales—E. Frank Gardiner, Midland Utilities Co., Chicago, Ill.

FEBRUARY 17—A.M.

How to Put Over the Blue Star Plan in Your Community—A. E. Higgins, field representative, A. G. A.

FEBRUARY 17—P.M.

Effective Methods of Compensating Salesmen—F. C. Mackey, Public Service Co. of Northern Ill., Chicago, Ill.

The members of the Mid-West Regional Sales Council are as follows:

P. D. Warren, *Chairman*, The Peoples Gas Light & Coke Company, Chicago, Ill.

H. L. Brown, *Regional Secretary*, The Peoples Gas Light & Coke Company, Chicago, Ill.

J. J. Burns, *The Laclede Gas Light Company*, St. Louis, Missouri.

D. E. Callender, *Wisconsin Gas & Electric Company*, Racine, Wis.

Albert Clabough, *Illinois Light & Power Company*, East St. Louis, Ill.

W. R. Evans, The Peoples Gas Light & Coke Company, Chicago, Ill.

D. H. Frazer, Jr., Battle Creek Gas Company, Battle Creek, Mich.

F. C. Hoffman, Northern States Power Company, St. Paul, Minn.

R. O. Jaspersen, Milwaukee Gas Light Company, Milwaukee, Wis.

Geo. C. Klopf, North Shore Gas Company, Chicago, Ill.

J. G. Learned, Public Service Company of Northern Illinois, Chicago, Ill.

F. X. Mettenet, Northern Indiana Public Service Company, Hammond, Ind.

C. A. Nash, United Light & Railway Company, Davenport, Iowa.

M. F. North, Northern Indiana Public Service Company, Fort Wayne, Ind.

A. H. Rand, Minneapolis Gas Light Company, Minneapolis, Minn.

H. R. Sterrett, Des Moines Gas Company, Des Moines, Iowa.

Industrial Men Plan

(Continued from page 120)

Additional subjects, such as the survey of a potential market, deciding what are logical prospects, keeping of records, the use of charts and graphs, and the use of a catalog file—will be covered.

R. L. Manier, chairman of the Survey Committee, reports that efforts would be continued toward interesting those gas companies that had not made industrial surveys into making them; those that had begun them into finishing them, and those that had completed surveys into keeping them periodically up-to-date. The committee will also make available recommendations on ways of applying the information resulting from a survey.

The Speakers' Bureau, of which A. M. Apmann is chairman, has completed organization and is cooperating with some of the speakers committees of the state public utility information bureaus. This is, however, a mutual agreement in which the industrial gas work will not be lost sight of because of the public relations work which the state committees are doing.

There is in the course of preparation some facts on industrial gas which can be distributed through the state committees to their various speakers for the general

talks on utility public relations as well as some talks of a general nature having the basis of the industrial gas work at the laboratory, the industrial gas research fund and the service given by the gas companies.

In order to promulgate those policies advocated by the Industrial Gas Section for the purpose of stimulating and increasing industrial gas sales, the Policy Committee, J. P. Leinroth, chairman, will correlate the activities of the entire Section.

New Cooking Chart and Meal Guide Is Offered

A NOVEL cooking chart and balanced meal guide is the latest wrinkle to be offered to gas companies as a means of stimulating the domestic cooking business. The chart contains a set of clock hands to check time for cooking and baking, and also has various meats and substitutes for meals as well as a complete list of marketing list pad.

The MONTHLY will see that requests for sample copies and prices are sent to the publisher of the chart.



Cooking chart and balanced meal guide as used by The Peoples Gas Light and Coke Company

TECHNICAL SECTION

WALTER C. BECKJORD, Chairman

HARRY E. BATES, Vice-Chairman

H. W. HARTMAN, Secretary

Four Hundred Feet of Six-Inch Main Erected by Catenary Suspension

By T. L. PEARSON

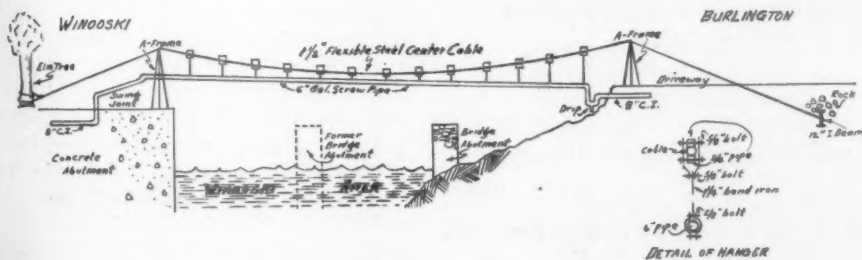
Superintendent, Gas Department, Burlington Light & Power Co., Burlington, Vt.

WINOOSKI, Vermont, supplied with gas from the city of Burlington, was deprived of its supply on November 4, when the eight-inch main was carried away with the bridge supporting it by the recent Vermont flood. The gas supply to Winooski consisted of a three-inch high-pressure line, 2.8 miles long from the gas plant in Burlington to a governor house situated a quarter of a mile from the Burlington side of the bridge connecting the two cities, where the pressure reduced from 40 pounds to four-inch water column. An eight-inch low pressure main crossed the bridge.

The gas was shut off at this governor house at 10 a.m., November 4, when it was plainly evident that the bridge would be carried out by the flood. Consequently no trouble was experienced by our distribution system in Burlington when the eight-inch main was broken off. The pipe broke off clean at the bridge abutments with only a slight distortion back in the street on the Burlington side of the bridge.

The U. G. I. Company of Philadelphia, which operates the Burlington company, was notified immediately of the task confronting us and promptly sent up one of their expert engineers, W. T. Jebb, who, with the assistance of the local superintendent, started the work of getting a pipe across the river to restore the gas service to the city of Winooski. The accompanying sketch shows the completed work which was finished Wednesday at 8 a.m.

As is known, the situation of turning on gas and purging out the air in a gas system consisting of five miles of various sized mains, with 642 gas services and 993 meters, is a very serious affair, but it is gratifying to be able to say that it was accomplished without a single mishap and not even one complaint from the consumers. The work of shutting off the service and meter cocks was started Saturday and completed Monday, great care being taken that every consumer was visited and warned not to attempt to use their appliances until a gas company em-



Diagrammatic sketch of temporary gas main across Winooski River

ployee called again and turned it on for them. Notices were published in the local newspapers stating the time and method by which the gas service would be resumed and emphasizing the danger of anyone other than an experienced gas company employee attempting to turn on the gas.

At the proper time the mains were purged out at all the drip risers and when the mains were full of unadulterated gas, the men were then started at turning on the gas in the houses and putting the gas appliances in good working order. A large force of men was employed in this work which was completed in two days.

The weight of the pipe and hangers suspended on the 1½-in. cable is approximately seven tons. The average daily send-out in Winooski is 100,000 cu.ft. Average peak load hour at noon is 9500 cu.ft. Differential pressure through suspended pipe at peak load is ¾ in.

A two-inch high pressure line was also installed across the river by a more circuitous route to be held in reserve as an emergency line. This line is 1200 ft. long and extends from the governor house on the Burlington side of the river to an old governor pit on the Winooski side where a spare governor was set up and connected to the eight-inch street main in Winooski.

The total expense of erecting these two lines was approximately \$1500.

These emergency lines will suffice until a new bridge is built when a permanent main will be installed.

In Memoriam

Fred Schroeder, Consolidated Gas Co. of New York, N. Y.

Wm. M. Cusack, Iroquois Gas Corp., Buffalo, N. Y.

J. H. Hobstetter, American Mfg. Co., Dayton, O.

James M. Dickey, Pacific Gas & Electric Co., San Francisco, Cal.

B. C. Edgar, Nashville Light & Power Co., Nashville, Tenn.

A. P. I. Reports

(Continued from page 112)

ervoir; and the setting of casing to separate all oil, gas, and water-bearing strata and, when gas is present in the same reservoir rock above the oil, to confine it so that its energy is directed downward to and through the oil rather than laterally to the well.

PRESSURE CONTROL

The retention of fluidity and energy and the production of the greatest volume of oil with the smallest reduction in rock pressure are both accomplished by the proper adjustment of the amount of pressure held on the sand. This is done by regulating the flow stream from the well in such a way as to regulate the fluid pressure on the exposed face of the reservoir in the well.

The methods which have been found effective in various fields are the tubing of wells, as early in their life as conditions allow, instead of permitting them to flow through the casing; the use of flow beans; the regulation of lengths and sizes of flow lines; the regulation of trap pressures; stop-cocking, or alternately closing and opening a well to maintain an intermittent flow; and the use of the air gas lift, which alters the fluid pressure on the face of the reservoir formation and simultaneously alters the fluidity, specific gravity, and energy in the fluid column in the well so that more efficient flow may be maintained. Each of these methods has been found valuable in various places and under various conditions, but no one of them is valuable under all conditions. As has already been emphasized, each fluid, each lease, and each well must be given individual study.

Wells which have too high a gas-oil ratio and refuse to respond to treatment should, whenever possible, be shut in to conserve the gas pressure. In certain cases this has been found to increase the production of nearby wells by more than the amount of the former production of

the shut-in wells, and the ultimate yield of the area should be considerably benefited. This is also, of course, a practice to be adopted only under unit or cooperative operation of the field.

In this class fall fields which have an area of free gas on top of the structure. The dissipation of this free gas not only deprives the field of a great energy value available to produce the oil, but draws the oil into the free gas area and disseminates it through previously dry sand from which most of it may never be recovered. The shutting in of the gas wells confines the oil to its original boundaries, permits the utilization of the energy and solution values of the gas, and defers the day of water encroachment.

INJECTION OF GASES

The general effects of injecting natural gas, air, or flue gas into a wholly or partially depleted reservoir have already been discussed. The three methods generally considered are pressure maintenance, repressuring, and gas drive. In practice the three are not always distinguishable.

In repressuring gas is introduced into the sand under pressure through certain wells while all other wells are shut in. The method has certain theoretical advantages and certain economic disadvantages, and has not been adequately tested.

In pressure maintenance and the gas drive gas—natural gas, air, or flue gas—is introduced into the sand through "key" or "input" wells, and oil and gas are produced from surrounding wells. The injection of gas should be started as early in the life of the field as production conditions will permit, and the gas injection and the maintenance of back pressure on the other wells should be so regulated as to maintain the original gas pressure as nearly as possible.

In certain Texas and Louisiana fields gas drive is estimated to have increased the ultimate recovery thirty-five to sixty per cent, with decided increases in current production.



Interior view of the Bournemouth Gas and Water Company's building, Bournemouth, England

GAS CONSERVATION AND UNIT OPERATION

Most of the methods discussed above cannot be effectively applied in fields in which the leases are in diverse ownership and competitive operating conditions prevail. The effectiveness of most of them depends on simultaneous application to the whole of a productive area. Proper well spacing, proper well timing, pressure control, pressure restoration, gas drive—only in rare cases can these methods be adopted by the competitive operator in a field. Unless a field is operated as a unit, whether by cooperation or control, there is little chance of holding down the gas-oil ratio, utilizing the energy and solution values of the gas, making the gas do the maximum work in the production of oil, or producing the greatest total amount of oil at the smallest cost.

(Signed)

Earl Oliver, *Chairman*

G. C. Gester, *For Pacific Coast*

W. P. Haseman, *Kansas-Oklahoma*
Fred E. Wood, *Rocky Mountain*
Region

John R. Suman, *Texas and Louisiana*

Max W. Ball, *Secretary*

Committee Structure of the A. G. A.

Giving Chairmen of Committees Organized to Date

General Committees

Accident Prevention—E. R. Dobbin, Geneva, N. Y.
 Affiliations—C. N. Stannard, Denver, Colo.
 Amendments to Constitution—W. J. Clark, Yonkers, N. Y.
 A. G. A. Testing Laboratory—R. W. Gallagher, Cleveland, Ohio.
 A. G. A. Approval Requirements—A. H. Hall, New York, N. Y.
 Award of Beal Medal—O. H. Fogg, New York, N. Y.
 Commission on Asphyxiation and Resuscitation—P. H. Gadsden, Philadelphia, Pa.
 Cooperation with Educational Institutions—W. G. Gribbel, Philadelphia, Pa.
 Education of Gas Company Employees—E. B. Luce, Baltimore, Md.
 Finance—James Lawrence, New York, N. Y.
 National Advertising—C. E. Paige, Brooklyn, N. Y.
 Nominating—H. H. Ganser, Norristown, Pa.
 Rate Fundamentals—W. L. Ransom, New York, N. Y.
 Rate Structure—G. I. Vincent, Syracuse, N. Y.
 Research in Industrial Gas Utilization—F. J. Rutledge, Philadelphia, Pa.
 Standards and Service—R. B. Brown, Milwaukee, Wisc.
 Taxation—W. A. Sauer, Chicago, Ill.

Natural Gas Department

Chairman: N. C. McGowen, Shreveport, La.
 Main Technical Committee—H. C. Cooper, Pittsburgh, Pa.
 Wrinkle—H. J. Struth, Cincinnati, Ohio.
 Gas Measuring Committee—F. M. Towl, New York, N. Y.
 Pipe Line Flow—H. D. Hancock, Kansas City, Mo.
 Convention Arrangements—H. C. Morris, Dallas, Texas.
 Exhibition—H. L. Montgomery, Bartlesville, Okla.
 Papers—L. K. Langdon, Cincinnati, Ohio.

Accounting Section

Chairman: Edward Porter, Philadelphia, Pa.
 A. G. A. Statistics—G. E. McKana, Chicago, Ill.
 Cost of Operating Motors and Mechanical Equipment in Distribution Work—M. F. Reeder, Chicago, Ill.
 Credit and Collection—G. A. Burrows, New York, N. Y.
 Exhibit—Sidney Curren, Newark, N. J.
 Fixed Capital Records—J. I. Blanchfield, Brooklyn, N. Y.
 Insurance—Harry Anderson, Chicago, Ill.
 Internal Audits of Departments—A. DiCarlo, New York, N. Y.
 Machine Payroll Accounting—W. S. Pruyn, Mt. Vernon, N. Y.
 Nominating—A. L. Tossell, Chicago, Ill.
 Office Personnel and Development of Office Labor Saving Devices—J. L. Conover, Newark, N. J.
 Relations with Customers—R. F. Bonsall, Baltimore, Md.
 State Representatives—F. H. Patterson, Rochester, N. Y.
 Uniform Classification of Accounts—H. M. Brundage, New York, N. Y.

Commercial Section

Chairman: J. J. Burns, St. Louis, Mo.
 General Commercial Policy—Samuel Insull, Jr., Chicago, Ill.
 Merchandising—E. R. Acker, Poughkeepsie, N. Y.
 Architect's and Builder's Service—R. G. Munroe, Denver, Colo.
 Blue Star Plan—H. H. Skinner, Dayton, Ohio.
 Sales Cooperation with Allied Trades—Heating and

Piping Contractors—H. L. Whitelaw, New York, N. Y.
 Appliance Dealers—G. M. Karahner, New York, N. Y.
 Domestic Cooking—E. J. Stephany, Pittsburgh, Pa.
 Home Service—Mrs. M. P. Wardman, Coney Island, N. Y.
 House Heating—Thomson King, Boyertown, Pa.
 Incineration—J. A. Weiser, Pittston, Pa.
 Domestic Laundry Equipment—J. E. Trainer, Columbus, Ohio.
 Water Heating—B. H. Gardner, Hammond, Ind.
 Window and Store Displays—R. M. Martin, New York, N. Y.
 Refrigeration—N. T. Sellman, New York, N. Y.
 Compensation of Salesmen—H. E. Dexter, Poughkeepsie, N. Y.

Industrial Gas Section

Chairman: F. C. Mackey, Chicago, Ill.
 Advertising—J. F. Weedon, Chicago, Ill.
 Competitive Fuels—W. F. Miller, Chicago, Ill.
 Education of Personnel and Contact with Educational Institutions and Technical Societies—J. P. Leinroth, Newark, N. J.
 Program—C. C. Krause, Baltimore, Md.
 Display and Contact with National Industrial Organizations—D. W. Chapman, Chicago, Ill.
 Hotel and Restaurant Sales Promotion—C. H. French, New York, N. Y.
 Nominating—H. O. Loebell, New York, N. Y.
 Policy—J. P. Leinroth, Newark, N. J.
 Progress and Contact with Furnace Manufacturers—J. F. Quinn, Brooklyn, N. Y.
 Publicity—H. O. Andrew, New York, N. Y.
 Industrial Rates—E. L. Wilder, Rochester, N. Y.
 New Heating Problems—N. T. Sellman, New York, N. Y.
 Speakers Bureau—A. M. Apman, New York, N. Y.
 Sales Methods—E. C. Weston, Toledo, Ohio.
 Survey—R. L. Manier, Syracuse, N. Y.

Manufacturers Section

Chairman: H. L. Whitelaw, New York, N. Y.
 Gas Manufacturing and Auxiliary Equipment Mfg.—W. H. Earle, New York, N. Y.
 Distribution Equipment Mfg.—D. B. Stokes, Burlington, N. J.
 Utilization Appliances Mfg.—R. C. Hoffman, New York, N. Y.
 Office Equipment Mfg.—E. A. Norman, New York, N. Y.
 Exhibition—H. L. Whitelaw, New York, N. Y.
 Nominating—W. E. Steinwedell, Cleveland, Ohio.

Publicity and Advertising Section

Chairman: E. F. Gardiner, Chicago, Ill.
 Nominating—H. C. Clark, Newark, N. J.
 Advisory Committee on A. G. A. MONTHLY—E. F. Gardiner, Chicago, Ill.

Technical Section

Chairman: W. C. Beckjord, New York, N. Y.
 Economic and Engineering Survey—H. E. Bates, Chicago, Ill.
 Carbonization—H. H. Himsworth, New York, N. Y.
 Water Gas—W. J. Murdock, Joliet, Ill.
 Distribution—M. I. Mix, Chicago, Ill.
 Chemical—E. C. Uhlig, Brooklyn, N. Y.
 Advisory Council on Research—W. C. Beckjord, New York, N. Y.
 Nominating—J. P. Haftenkamp, Rochester, N. Y.

Associations Affiliated with A. G. A.

Canadian Gas Association

Pres.—P. V. Byrnes, United Gas & Fuel Co., Hamilton, Ont.
 Sec.-Tr.—G. W. Allen, 7 Astley Avenue, Toronto.
 Conv., Hamilton, Ont., June 21 and 22, 1928.

Empire State Gas and Electric Association

Pres.—H. O. Palmer, Empire Gas & Electric Co., Geneva, N. Y.
 Chairman Gas Section—O. H. Smith, Consolidated Gas Co. of New York, New York, N. Y.
 Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
 Conv., Upper Saranac, N. Y., Oct., 1928.

Illinois Gas Association

Pres.—P. D. Warren, The Peoples Gas Light & Coke Co., Chicago, Ill.
 Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
 Conv., Springfield, Ill., March 14 and 15, 1928.

Indiana Gas Association

Pres.—I. C. Shepard, Southern Indiana Gas & Elec. Co., Evansville, Ind.
 Sec.-Tr.—F. B. Tracy, Central Indiana Gas Co., Muncie, Ind.
 Conv., 1928.

Michigan Gas Association

Pres.—F. W. Steere, Semet-Solvay Co., New York, N. Y.
 Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
 Conv., Grand Hotel, Mackinac Island, Mich., July 5 to 7, 1928.

Mid West Gas Association

Pres.—C. A. Nash, United Light & Railway Co., Davenport, Iowa.
 Sec.-Tr.—A. W. Schmidt, Des Moines Gas Co., Des Moines, Iowa.
 Conv., Cornhusker Hotel, Lincoln, Nebr., April 18-20, 1928.

Missouri Association of Public Utilities

Pres.—W. H. Henby, St. Louis County Water Co., St. Louis, Mo.
 Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
 Conv., 1928.

New England Gas Association

Pres.—William Gould, Gas and Electric Improvement Co., Boston, Mass.
 Secretary—E. A. Taylor, 100 Weybosset St., Providence, R. I.
 Chairman Operating Div.—A. H. Scott, New Britain Gas Light Co., New Britain, Conn.
 Secretary Operating Div.—R. L. Knowlton, Providence Gas Co., Providence, R. I.
 Pres. Sales Div.—M. B. Webber, Marlboro-Hudson Gas Co., Boston, Mass.
 Sec.-Tr.—Sales Div.—J. H. Sumner, 719 Massachusetts Ave., Cambridge, Mass.
 Pres. Industrial Div.—E. W. Berchtold, Boston Con. Gas Co., Boston, Mass.

Sec.-Tr. Industrial Div.—L. E. Wagner, Providence Gas Co., Providence, R. I.
 Chairman Acctg. Div.—W. A. Doering, Boston Con. Gas Co., Boston, Mass.
 Sec.-Treas. Acctg. Div.—Otto Price, Boston Con. Gas Co., Boston, Mass.
 Conv., Hotel Statler, Boston, Mass., Feb. 15 and 16, 1928.

New Jersey Gas Association

Pres.—J. L. Conover, Public Service Electric & Gas Co., Newark, N. J.
 Sec.-Tr.—Louis Stoecker, Public Service Electric & Gas Co., Newark, N. J.
 Conv., Stacey Treat Hotel, Trenton, N. J., Jan. 25, 1928.

Ohio Gas and Oil Men's Association

Pres.—J. J. McMahon, The East Ohio Gas Co., Cleveland, O.
 Sec.-Treas.—Wm. H. Thompson, 811 First National Bank Bldg., Columbus, O.
 Conv., 1928.

Oklahoma Utilities Association

Pres.—E. R. Ernsberger, Southwestern Light & Power Co., Oklahoma City, Okla.
 Mgr.—E. F. McKay, Oklahoma City, Okla.
 Conv., Tulsa, Okla., March 13-15, 1928.

Pacific Coast Gas Association

Pres.—L. M. Klauber, San Diego Consolidated Gas & Electric Co., San Diego, Calif.
 Exec. Sec.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.
 Conv., Coronado, Calif., Sept. 17-21, 1928.

Pennsylvania Gas Association

Pres.—J. A. Weiser, Peoples Light Co., Pittston, Pa.
 Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
 Conv., Yorktowne Hotel, York, Pa., April 10 & 11, 1928.

Southern Gas Association

Pres.—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.
 Sec.-Tr.—J. P. Connolly, 141 Meeting St., Charleston, S. C.
 Conv., Jacksonville, Fla., April 17-19, 1928.

Southwestern Public Service Association

Pres.—M. T. Walker, Southwestern G. & E. Co., Shreveport, La.
 Chairman Gas Section—C. M. Thompson, Texas Power & Light Co., Waco, Texas.
 Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.
 Conv., Dallas, Texas, May 2 to 5, 1928.

Wisconsin Utilities Association

Pres.—John St. John, Madison Gas & Electric Co., Madison, Wis.
 Exec. Sec.—J. N. Cadby, 432 Broadway, Milwaukee, Wis.
 Conv., 1928.

Geographic Divisions

Eastern States Gas Conference

Pres.—H. H. Newman, Public Service Electric & Gas Co., Trenton, N. J.

Sec.-Tr.—J. C. Smith, Consumers Gas Co., Reading, Pa.
 Conv., Newark, N. J., April 5 and 6, 1928.

Tenth Annual Convention of the American Gas Association
Atlantic City, N. J.

October 8-12, 1928

Annual Convention of the Natural Gas Department
Dallas, Texas

May 7-10, 1928

Employment Bureau

(Address All Communications to Key Number)

SERVICES REQUIRED

WANTED—Sales Representatives for industrial gas appliances and burners by manufacturer of trade name line. Commission. Have openings in Chicago, St. Louis and a few other industrial centres. Address A. G. A.
Key No. 0106.

SALESMEN—Well-known manufacturer of water heaters is in need of local representatives in several cities. The type of man wanted should be about 30 to 35 years of age, well educated, healthy, good business experience including direction of other employees. Reply, giving full qualifications, present connection and salary. Treated in confidence. Inclose photo if available. Address A. G. A.
Key No. 0107.

WANTED—Works Foreman. One that can get results and capable of handling men. Send out 150,000 daily. First class location. The plant and mains in good condition. State salary and experience in first letter. Address A. G. A.
Key No. 0110.

GAS RANGES SALESMAN to represent a Trade Mark Line of Gas Ranges and Broilers—both Domestic and Hotel Lines. One experienced and having some acquaintance with West Shore Gas Companies in Illinois and Wisconsin preferred. Address A. G. A.
Key No. 0111.

GAS SALES ENGINEER—Experienced in house heating. State in detail experience, age and salary desired. Address A. G. A.
Key No. 0112.

WANTED—Live wire organization preferably, or an established individual to represent manufacturer of a new type—nationally advertised water heater. Full cooperation and generous commissions paid. Water heater is now completed and selling fast. Address A. G. A.
Key No. 0113.

SERVICES OFFERED

POSITION wanted as Superintendent of small gas company or as General Foreman of large plant. Approximately seventeen years' experience in all branches of manufacture and distribution, high and low pressure systems. Address A. G. A.
Key No. 224.

CHEMICAL ENGINEER—with 7 years' experience in the testing and developing of different classes of gas appliances also familiar with the testing and utilization of natural gas and manufactured gas—A-1 references. Address A. G. A.
Key No. 227.

A GRADUATE of California University desires a position as Private Secretary and Stenographer, has considerable experience in Utility work and can give satisfactory references. Address A. G. A.
Key No. 229.

WANTED—Position by young woman, B.S. in Chemistry as technologist, in library or in home service department. Nine Years' experience. Address A. G. A.
Key No. 235.

COMMERCIAL OR SALES MANAGER with fine record of achievement, available for northern location near future. Responsible for one of the outstanding gas properties of 1926. Capable organization and operation of complete commercial department including sales, advertising and publicity and public relations. Vitally interested in heating and refrigeration load. Contract on salary and commission basis. Southern climate unsuitable reason for change. Address A. G. A.
Key No. 236.

CHEMICAL ENGINEERS—1½ years' experience as Chemist at Gas Works. 2 years as Research Chemist for solid fuels and oils. Desires a position as Research Chemist or Development Engineer. A-1 references. Address A. G. A.
Key No. 238.

WISH POSITION with company that has need for a man of my qualifications and training. Nine years' experience in the gas industry having been a cadet engineer and plant foreman in large company and for the last four years manager of small property; can operate water gas sets with either hard or soft coal; thoroughly familiar with both high and low pressure distribution, technical graduate, 37 years old, married. Address A. G. A.
Key No. 240.

MASSACHUSETTS Institute of Technology graduate with seven years' practical experience, three years in gas business coke oven, producer gas, water gas and some distribution experience. Desire position as Assistant or Cadet. Best of references. Address A. G. A.
Key No. 241.

SPECIAL UTILITY ENGINEER—Revamping, construction or development work; with large operation or holding company preferred. Age 45. Experience 27 years as superintendent, engineer and manager of moderate growing systems; Koppers coke plants and waning natural gas. All kinds distribution. Also combustion specialties business. Would consider short term Foreign commission. Address A. G. A.
Key No. 242.

POSITION WANTED—as Superintendent or General Foreman of artificial gas plant. Eighteen years experience in manufacture and distribution, high and low pressure systems. Address A. G. A.
Key No. 243.

GAS ENGINEER of a large By-Product Coke Company desires to locate with a Gas Company. Technically trained and has a valuable practical experience in operation of coal gas, water gas and coke oven plants extending over the past twenty years. Age 40. Address A. G. A.
Key No. 244.

ASSISTANT TO EXECUTIVE: Married, 37 years old, secretary to well-known executive in New England Company, wishes similar position in medium size company. Anywhere. Best of references. Reason for change, reorganization of management. Address A. G. A.
Key No. 245.

AGGRESSIVE MANAGER or General Superintendent, 25 years in the industry, familiar with all branches of operation and construction. Best of references. Available about March 1, 1928. Address A. G. A.
Key No. 246.

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